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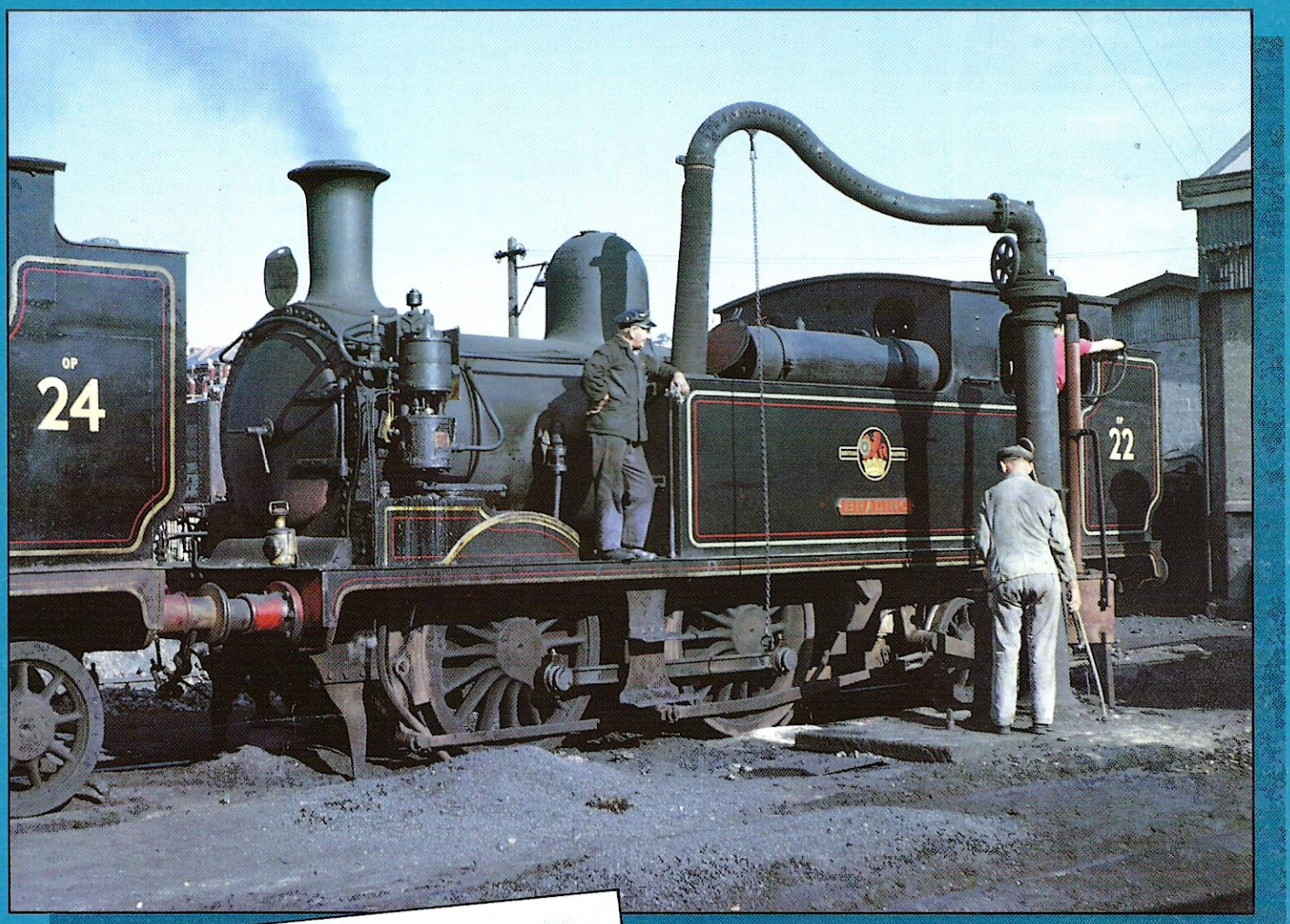
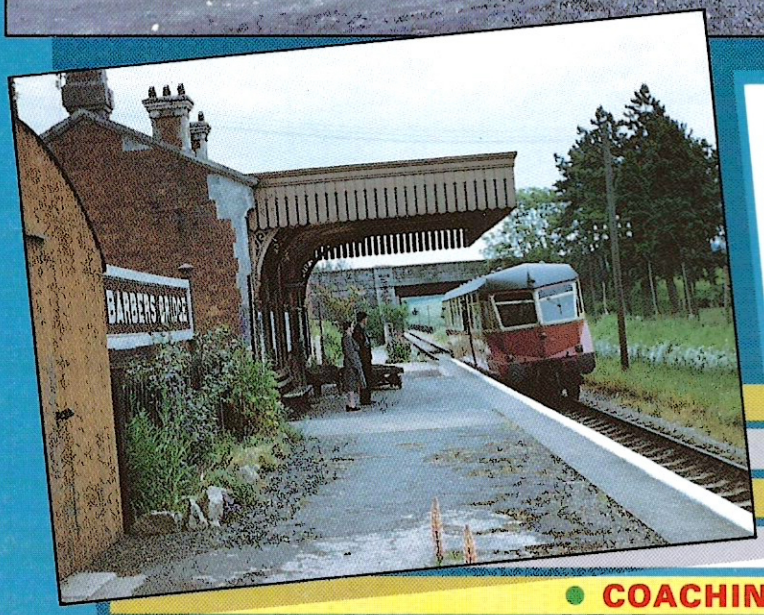
BackTrack

RECORDING BRITAIN'S RAILWAY HISTORY





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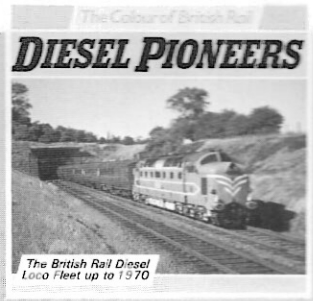

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BackTrack

RECORDING BRITAIN'S RAILWAY HISTORY

Vol.2 No.3 Autumn 1988

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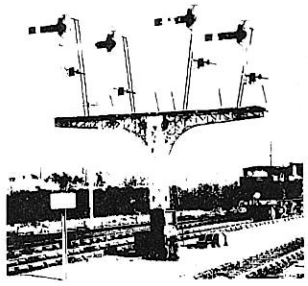
THE MIDDLE GROUND

All ideas start somewhere. The train of thought which resulted in David Jenkinson's article on coaching stock design and construction, part one of which appears in this issue, began in 1983. I was talking to Dave Howley, chief motivator of the Sales Dept of the Severn Valley Railway. What book, I asked him, was he most asked for in the railway shop at Bridgnorth? The latest GWR picture book, perhaps? The new spotter's guide?



It was neither. There was, David said, a constant (and unfulfilled) demand for a simple, illustrated, text describing how the steam locomotive works. People wanted to be taught. Now, not all visitors to Bridgnorth are *enthusiasts,* but the point was a good one — enthusiasm often implies knowledge, but the correlation should never be taken for granted; the fact that it almost always *is* has contributed in no small measure to the present malaise of railway publishing.

That conversation at Bridgnorth sowed the seeds for at least some of the material which has appeared already in BACKTRACK, including John Hilton's series on the mechanics of the steam locomotive. So many of today's enthusiasts joined the hobby as 'spotters' in the 1950s and 1960s and their interest has long centred on the locomotive. But now, their knowledge sated by picture books and class studies galore, they are turning elsewhere for pleasure — to stations, signalling and rolling stock.

So, in this issue, David Jenkinson provides the first in a two-part introduction to coaching stock design and construction. Quite what we should offer in this commissioned feature was the subject of much discussion. David was concerned that the piece should not be too general, or too basic. We are all familiar with the glossy, cheap, 'coffee-table' books designed by committees and targetted at those who 'like trains'. Packed with obvious superficialities, they hold little appeal for the serious enthusiast.

But almost as bad are those publications composed exclusively of unexplained technicalities which leave the average reader baffled and feeling faintly cheated. David's article, I feel, fills the middle ground. Engineering fundamentals are explained, but the essential romance and evolutionary momentum of the railway, wherein lies so much of its appeal, are not forgotten.

And we should not overlook the fact that railways were *invented* to carry goods and passengers. Without the wagon, without the carriage, there would be no conceivable need for the fabled locomotive. The mass of information on the latter, and the dearth of published material on the former, is really putting the cart before the horse (although metaphors become dangerously mixed, here).

BACKTRACK READER SURVEY

Our lead article in the last issue provoked a gratifyingly large mailbag. Some readers questioned the validity of our conclusions, but the great majority felt that *any* exercise of this kind is healthy. Oddly, there was complete silence from the Great Western camp, our evidence that support for Swindon is slipping passing unchallenged. One or two correspondents were aggrieved that our survey had been conducted amongst subscribers only, but as I believe I made clear, the exercise was originally intended as a publisher's market survey and not for publication. Will we do something similar again? The answer is yes.

Nigel Trevena

NEXT ISSUE ON SALE
6th October 1988

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Empty Stock

ABOVE: One of the unsuccessful Fowler 3MT 2-6-2Ts, 40053, climbs Camden Bank on 3rd October 1959 with an empty stock train. The second carriage is a restaurant car with two six-wheeled bogies. Photo: R. C. Riley

BELOW: Another Fowler design, 4F 0-6-0 43988, a Walton on the Hill (27E) engine on station pilot duties, works into Aintree Central with ECS for a return race day special to Cleethorpes on 31st March 1962. The observation car, M280M, built for the SR's Devon Belle and transferred to the LMR in the mid 1950s, was one of a pair dating from 1947. Photo: Peter Fitton

BRITISH COACHING STOCK DESIGN AND CONSTRUCTION

The first in a major two-part survey by **DAVID JENKINSON**

ONWARDS from the STAGECOACH

For most people, the railway carriage door is the first and probably only contact they ever have with the moving machinery of the railway and, for the vast majority, their knowledge and understanding remains firmly rooted within their day to day experience of rail travel, rarely getting beyond a vague awareness of the carriage interior and even less likely to venture as far as wondering how the carriage got there, let alone how it actually works.

This present review will start from the days when the railway carriage evolved from the stagecoach and, because this is a historical journal will stop, more or less, with the BR MkI period. One must, of course, end somewhere, but even though some MkIs seem likely to last well into the 21st century, especially on the Southern electric lines, their basic evolution is finished and is thus genuinely historic. The later period, however, is still evolving and does not, as yet, lend itself to retrospective assessment. Even though all the MkIIs and most MkIIIs have now entered service, they still have some time to go and many will undergo much future modification if past experience is any guide.

I will be making no real attempt to relate the story too closely to any specific company or works; it will be an outline survey only and I shall prefer to deal in generalities and principles which most railways followed. Also I will not dwell too long on the minutiae and the maverick, preferring instead to give the sort of information which should enable readers to get a clearer understanding of the basic background from which they can then develop their own detailed studies should they so wish. Lastly and purely for space reasons, I shall mostly confine attention to locomotive-hauled passenger carrying stock.

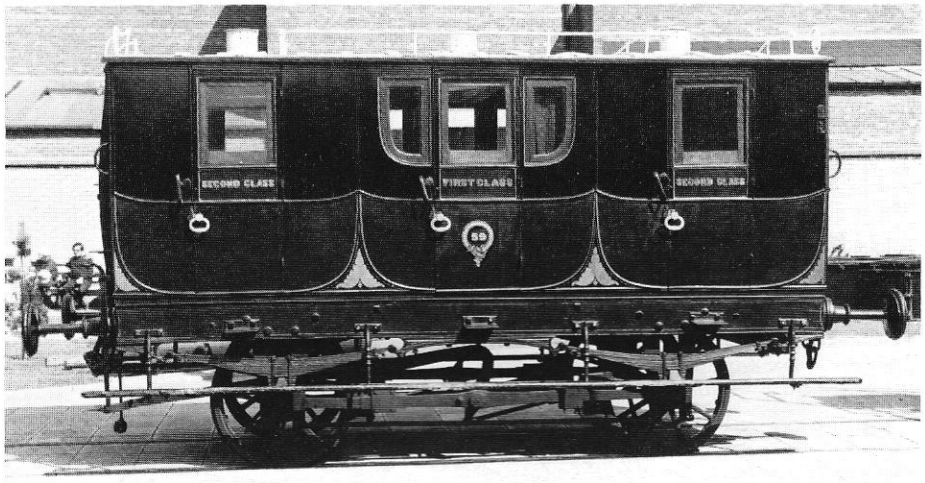
More than any other railway vehicle, the passenger carriage represents the interface between technology and humanity — if for no other reason than the fact that its normal load is the only sort of cargo which can comment upon its travelling conditions. Thus, even at the basic level of the most simple coach, the human factor was present from the start and has remained there ever since. The railway was invented for freight (does BR still know this, I wonder?), so it should occasion no surprise at all, even at the most basic level of vehicle design, that it was not until people began to travel that any real attempts were made to improve the nature of railway rolling stock from the primitive coal carrying chaldrons and their like — and even in carriage terms it was not exactly rapid after then.

Underframe

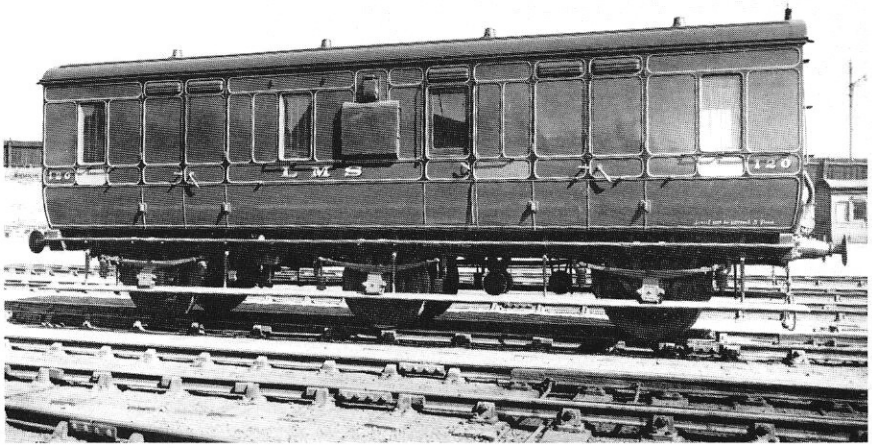
From the start of the mechanised railway until well into the second half of the 20th century, the typical British carriage was, customarily, built in two quite separate parts, its chassis and its body. It was not until quite late in the building process that the two were united and there were many instances where body and chassis were constructed independently of each other, often even in geographically separate works. The reasons for this were historic and we can quickly understand why. The vehicle body did not represent anything new in the technical sense — we had been building road coaches for several centuries — but the running requirements of the mechanised railway were a new phenomenon, only really understood by the newly developing band of 'railway' engineers. Under these circumstances, it probably seemed quite natural, from the very early days, that the making of the running gear should be left to them. A modern day analogy springs to mind in the commercial road vehicle industry where vehicle body builders are a very different breed from the chassis manufacturers.

The carriage chassis consists of a rigid structural framework, known as the underframe, onto which basic unit are subsequently attached the various components of the running gear (wheels, springs, bearings, etc) and the draw gear (couplings, buffers, etc). The underframe also carries most of the other ancillary equipment which might be needed. In early days this was rarely more than the brake apparatus, but as years went by, this was regularly augmented by much more — e.g. gas and/or electric light fitments, heating pipes and so forth.

The main frame itself was in the form of a horizontal flat rectangular girder structure, built-up from many component parts. Regardless of precise arrangements — there were many subtle variations between individual makers — it was always heavily cross-braced between its main outer side members (solebars) and its outer ends (headstocks). The main material was timber during the early part of the railway age, usually reinforced by iron (later steel) plates, brackets or corner angles. In time, some of the structural components were themselves augmented by steel plates bolted to one or both of their outer faces. This process of attaching a metal plate to the whole face



The classic three-compartment four-wheeler with a 'stagecoach' styled body form is well exemplified by the preserved Stockton and Darlington Composite 59 of 1846 at the National Railway Museum. The black and dark red livery is typical of the time, as are the curved lower corners of both panelling and compartment windows. The term 'quarterlight' was derived from this window shape — basically a quarter of a circle. Only the first class had such luxuries at this time, or cushions in the compartment for that matter. Photo: Crown Copyright, NRM



This early 20th century six-wheel brake van of Midland origin, seen running as LMS 120 c.1925, typifies the British three-axle carriage. Note the longer spring hangers to the central axle; this was to permit greater sideplay for the middle set of wheels when negotiating curves. The panelled body style — and its lined livery — is both typically Midland and typically British, while the roof is of the low elliptical form. Photo: LMS Official, courtesy NRM

of a major wooden component — usually, but not exclusively, the solebars or headstocks — was known as 'flitching'; it was a common practice in mid-19th century locomotive frame construction as well.

This composite timber and steel form of underframe construction became increasingly more popular with the development of larger bogie coaches and, although eventually replaced in the 20th century by the 'all-steel' form, it had a long and honourable life, lasting well beyond the Victorian period. Supplemented by inner longitudinals and heavier cross-members, it could be given immense strength, quite capable of carrying the 40 ton (or greater) weights of the 12-wheel dining and sleeping cars which were being built at and after the turn of the century.

Although the basic configuration of the carriage underframe was, in all significant respects, independent of its length, the gradual increase in the use of bogie carriages from late Victorian times onwards (the first of them actually dated from the mid-1870s) caused a new problem to appear — that of the underframe sagging in the centre because of the heavy unsupported weight between the points of attachment of the bogies. This was no great problem in four and six-wheel carriages, save in the case of ultra long wheelbase four-wheelers should their underframes be made largely of timber; the same sort of problem regularly affected wood framed wagons too, as many readers will, no doubt, recall.

The tendency to sag was arrested by means of additional trussing set vertically to the main horizontal plane of the underframe. The uprights were known as queenposts, between which were fastened truss-rods fashioned from round bars which continued past the queenpost itself and were then taken upwards at an angle to be anchored to the solebar. The side truss-rod was usually formed from two pieces, 'broken' between the queenposts and these 'free' ends were then threaded and attached to the opposite ends of a single, similarly threaded 'turnbuckle'. Very occasionally, each side truss-rod was in three pieces with two turnbuckles and quite regularly, underframes for the heavier carriages had extra sets of truss-rods fixed to the central longitudinals. Opposite ends of an individual turnbuckle and its mating truss-rods were right and left-hand threaded so that each end behaved in the same way when rotated — either tightening or slackening. Before fixing the body to the underframe, the turnbuckles were rotated so as to 'pull' or 'push' the underframe into shape, normally about ½in higher in the centre than over the bogies. The weight of the body brought the underframe level while the trussing itself, with queenposts in compression and round bars in tension, maintained the integrity of shape.

The forces within a trussed, bogie carriage underframe did not change with the onset of all steel components, but the increasing use of heavy 'L' and 'T' section angle allowed much more rigidity to be built in from new. As a consequence, the familiar angle-trussed underframe of the present century had no need for adjusting mechanisms comparable with the old turnbuckles, even though the queenpost and side trusses were still in much the same place. In our present day, virtually all conventional carriages have angle trussed underframes but that of the BR MkI is slightly different from most of its predecessors in that the main trussing (a sort of lattice girder arrangement) is part of the central longitudinals, leaving an almost uninterrupted sub-floor space between the central members and the solebar.

Wheels

Turning now to the wheels and associated running gear, there was a fundamental difference in the springing arrangement adopted for four or six-wheel carriages and that of a bogie vehicle. In both forms, the wheels themselves were fixed to axles whose ends projected beyond the wheel face, the outer end of the axle being known as a journal. This was carried in a separate axlebox which could slide up and down between vertical 'guides', fashioned into flat metal assemblages of various shapes, depending as much on the individual designer as on anything else. Some of these 'axleguards' were identical to the familiar 'W' irons of a goods vehicle, others were more substantially made. They were fixed to the frame of the vehicle — either direct to the solebars in the case of four and six-wheelers, or to the bogie side frames if present. Vertical shocks were absorbed, usually, by leaf springs mounted on top of the axlebox, while the outer ends of the spring were anchored to hangers fixed to the frame in such a way as to allow movement of the spring ends as it flexed under load. This form of springing, known as primary suspension, was all that was present on a four or six-wheel carriage. Bogie vehicles were different.

Bogies

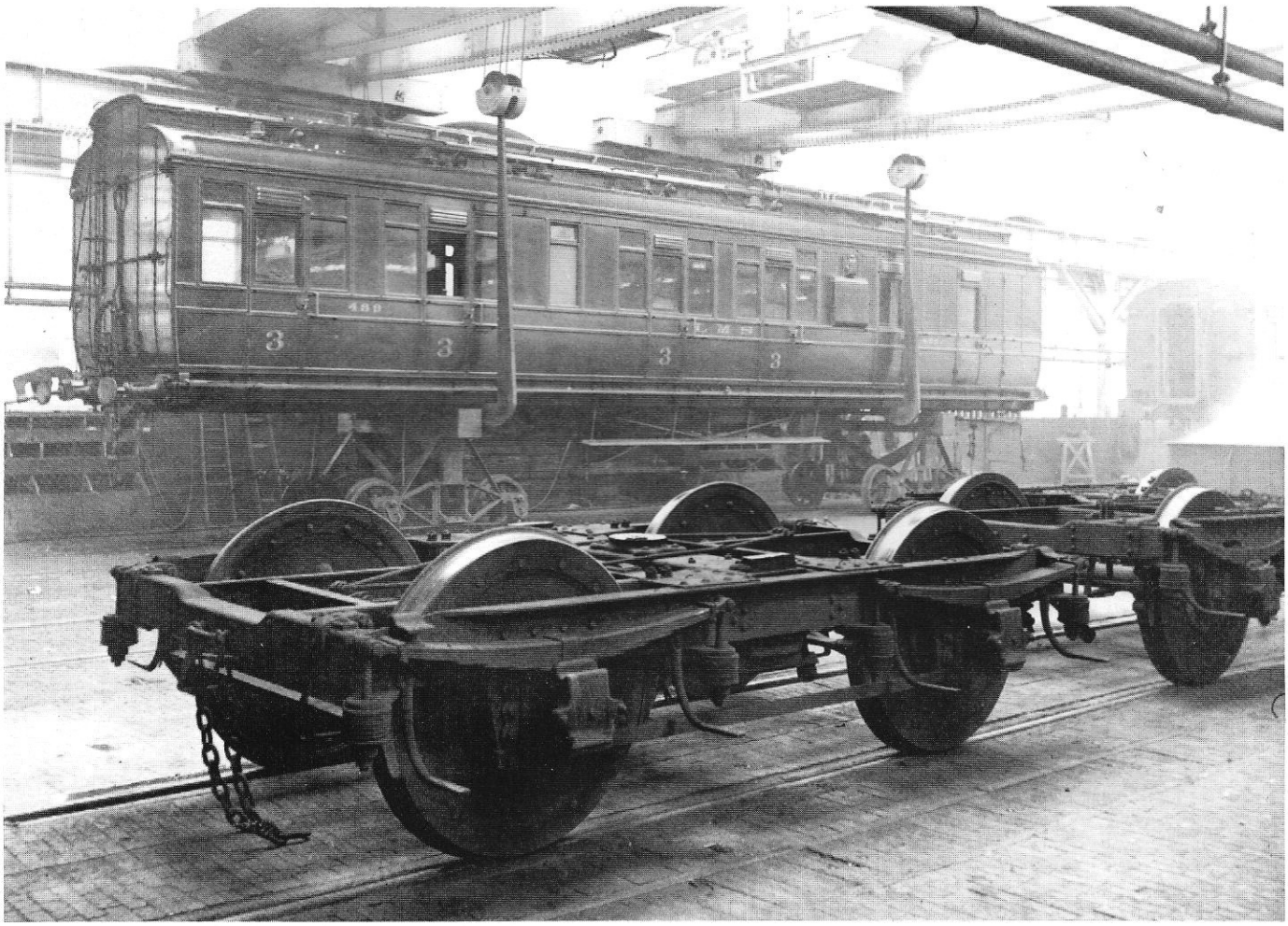
A normal carriage bogie consists of a rigid frame to which are attached the axleguards carrying the axleboxes and primary suspension — it is, in every way, an orthodox four-wheel vehicle. The primary suspension is, these days, no longer always by leaf springs — indeed it is more likely to be anything but. Furthermore, even historically speaking, many bogies were often fitted with equalising side beams between adjacent axleboxes rather than with individual leaf springs. This arrangement was known as an 'American' bogie and its most modern manifestation, the 'Commonwealth' bogie, is still widely used on BR. With an equalising bogie, the individual axleboxes are connected together with a side beam between their axlebox tops. When one wheel rises in its axle guide, the other drops to compensate. In fact, 'compensating beam bogie' is another term which will often be found used to describe the system. The movement of the beam is damped by heavy coil springs, usually one at each end, between its upper edge and the main bogie side frame.

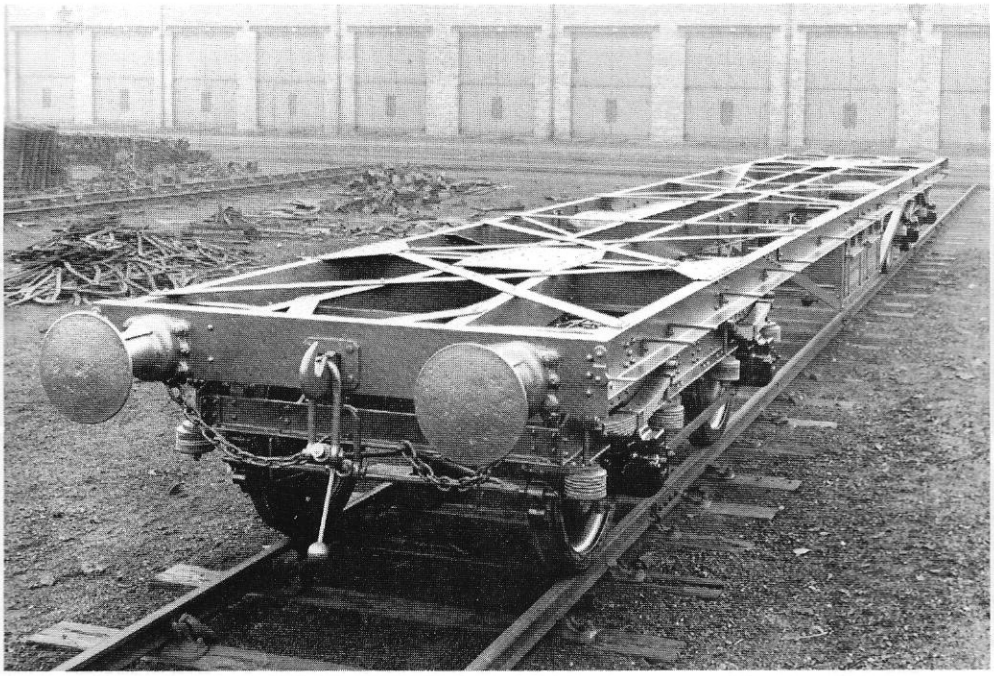
Regardless of the precise method adopted, this primary suspension still only takes care of movement between the bogie frame and the track itself and in this respect, its function, even on ultra-modern stock, differs little from that provided by the more simple axleguards and leaf springs of a four or six-wheeler. The advantage of the bogie was that much more sophistication could be provided by way of secondary suspension and this was achieved by use of a bolster, one of the least understood components of the whole carriage as far as the layman is concerned. One almost needs a 3-D visual aid to show what is happening but I will try my best in words.

The bolster in the traditional form of carriage bogie is the means of attachment of the body itself to the bogie frames. It takes the form of a transverse plank-shaped component and carries a central pivot mechanism to mate with its opposite number, often called a 'king pin', below the floor of the carriage body. In this context, the 'body' of a bogie coach should be taken to mean the body carcass *plus* its underframe, the bogie attachment being on the latter. The bolster is set at right angles to and between the sideframes of the bogie and hangs between the central transverse frame cross-bracing by means of a pair of pivoted arms at each end, known as swing links. The weight of the

carriage body is transmitted through the pivot to the bolster and thence via the swing links to the bogie frame itself. The weight of the body, therefore, *hangs from* the bogie frame, even though outwardly it seems to rest on top. The effect of this weight transfer is that the carriage body actually *pulls* the bogie frame downwards towards the track. Since, because of the swing links, the bolster — and hence the carriage body — can move independently of the bogie frame, opportunity can be taken to give it separate damping devices to those of the primary suspension. This is usually referred to as 'bolster springing' or 'secondary suspension' and, in conventional form, could usually be seen in the form of coil springs or, on older vehicles, transverse double elliptical leaf springs above the bolster.

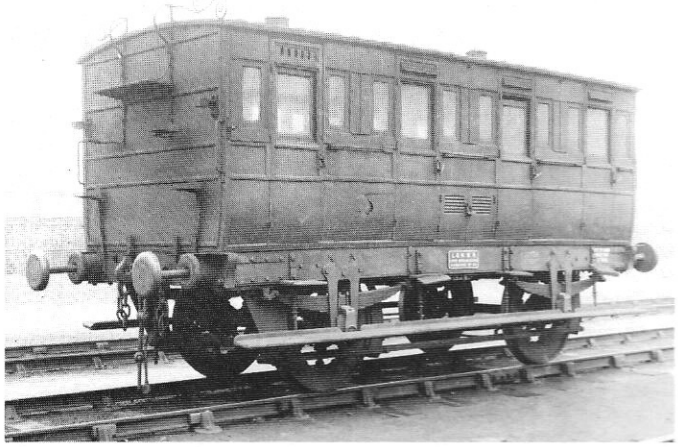
The natural movement of the bolster within the frame is from side to side, the amount of displacement depending largely on the magnitude of the sideways forces, the length and nature of the swing links, the strength of the secondary suspension and any restraining devices which may be fitted either to the bolster itself, the bogie sideframe or the carriage floor in order to prevent the side-to-side swinging becoming too great. Furthermore, the swing links are set slightly closer together at their upper points of attachment than at their lower ends, an aspect revealed visually by the inward slope of the swing links upwards from their lower ends. Therefore, when the bolster swings sideways as, for example, when rounding a curve under





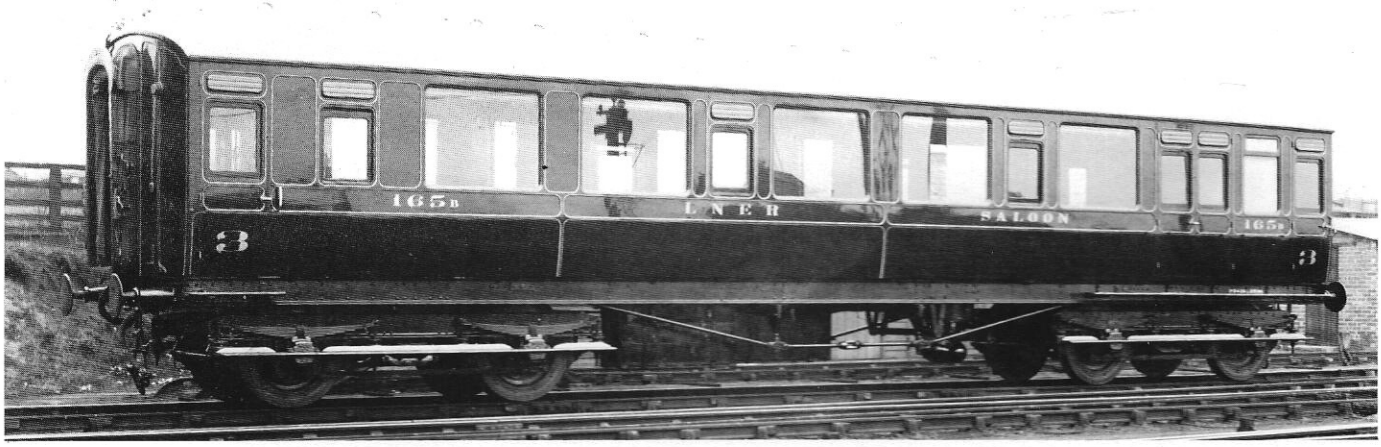
ABOVE: This view, taken in the lifting shop at Derby, c.1925, shows, in the background, a former MR clerestory lavatory non-corridor brake third 489 attached to its underframe and about to be traversed onto its bogies. The truss rods and turnbuckle are partly obscured behind the lower side steps. Two bogies stand in the foreground; note the bolster plank between the wheels with the bogie pivot fixed centrally thereto. Note also the restraining 'rubbing blocks' at the ends of the bolster plank. The ends of the swing links can just be seen behind and below the main frame, between the wheels. Photo: LMS Official, courtesy NRM

LEFT: Typical angle-trussed bogie underframe of LMS pattern, attached to its bogies but still awaiting the fitting of brake and steam pipes. It is almost certainly awaiting transfer to the erecting shop where it will be united with its bodywork. Photo: LMS Official, courtesy NRM



LEFT: The characteristic early four-wheel carriage underframe is well seen in this view of a very late survivor into LNWR departmental stock, now functioning as a locomotive breakdown carriage, c.1923. The rather flimsy axleguards are mounted outside the solebars, the axleboxes are of the grease variety (i.e. packed with semi-solid grease which melted by friction to lubricate the journals), while the buffers and screw couplings are of the very earliest pattern. The side panelling and four compartment layout are, however, slightly transitional from the very early form of 'stagecoach' body style. Photo: LMS Official, courtesy NRM

RIGHT: Traditional headstock detail and 'plumbing' on a former LNWR arc roof non-corridor third class brake, LMS 22515, at Leamington Spa in the mid-1930s. Note particularly the body restraining brackets, situated between the buffer shanks and the headstock lamp irons. The carriage itself is typical of late Victorian LNWR practice and was built c.1900. Photo: Gordon Coltas



The NER designed some very handsome gangwayed carriages and after the grouping the LNER ran many of them with Pullman gangways plus buckeye couplings, usually with replacement Gresley bogies as well. This pair of pictures shows 'before' and 'after' examples, thus allowing comparison to be made between the two types. Third Class saloon 165B has the traditional British Standard arrangement while First Class open 976Y has the LNER standard fittings — note the extension 'collars' on the buffer shanks. The pictures date from 1924 and both carriages still carry the NER lined crimson livery. Note the single turnbuckle between the queenposts on 165B and the two turnbuckles outboard of the queenposts on 976Y. Photos: LNER Official, courtesy NRM

the influence of centrifugal force, the outer links will adopt a more vertical position and the inner pair a more horizontal one, thus causing the carriage body, fixed to the bolster, to tilt inwards towards the curve. This is precisely what the passenger instinctively wants to happen for his greater comfort. This behaviour of the moving bolster also explains the often quite restful swaying motion of a well-balanced carriage.

Unfortunately, however, if the links are too sloppy, usually because the link pivots have become worn, there can also build up an unpleasant degree of fore and aft movement of the bolster within the frame whose 'shuddering' effect, especially at starting or stopping, can be very uncomfortable. On older carriages, where speeds were not as high as on the modern railway, this posed less of a problem but was always a risk, especially if made worse by poor track. The best and most effective traditional solution to this problem was Nigel Gresley's patent design of GNR/LNER bogie which, in effect, had twice as much secondary suspension in the form of a compound 'double' bolster which gave it a superlative ride quality. The modern BR bogie usually disposes of this fore and aft movement by means of a horizontal 'traction' bar, mounted prominently on the outside of the bogie with one end fixed to the bogie frame and the other to the bolster. This virtually eliminates unwanted fore and aft movement of the bolster.

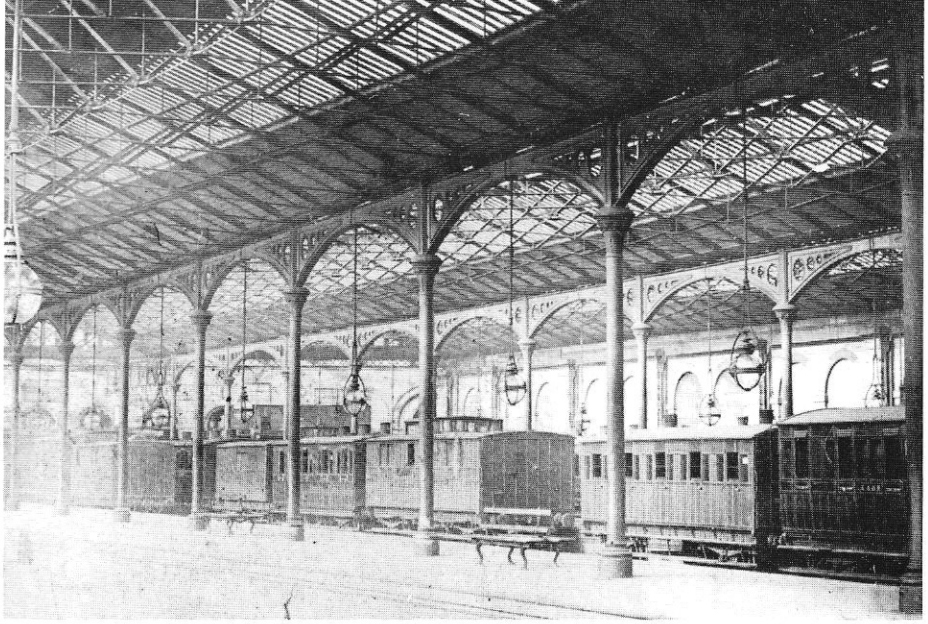
Now, I have no doubt that professional carriage engineers reading the above would point out that things were rather more complicated than I have described them and that other factors came into play such as superelevation of track, heavy duty bolster springs and so forth. Furthermore, modern bogies also deploy much more sophisticated basic springing arrangements; even wheel profiles can affect the business. Nevertheless, I hope that the above outline will at least go some way to explain the mystery.

One point I have not yet explored which should be mentioned is the need to have a bogie anyway. Seat for seat, assuming the same number of seats per foot length of vehicle, four and six-wheel coaches are both cheaper to make and lighter in weight than the bogie equivalent and this undoubtedly influenced British companies through most of the 19th century, for the bogie was by no means unknown. It actually originated in North America at a very early stage on both locomotives and coaches, largely to cope with the rather more curving nature of pioneer lines in America and greater vertical gradient changes. By contrast, most British main lines were laid out on very fine alignments with gentle curves and, for the most part, modest gradients. Under these circumstances, rigid wheelbase carriages were quite acceptable at the modest speeds of the time.

The American experience demonstrated not only that very large vehicles could get round quite sharp curves if fitted with bogies, but that their ride quality was enhanced both by the bogie suspension itself and also by the heavier weight carried, particularly at higher speeds. It was the latter considerations, rather than line curvature, which seemed to tip the balance in Britain as railways speeded up their services. At high speed, the four and six-wheel vehicles could give a very rubbishy sort of ride even on the well aligned British lines and some companies, led by the Midland Railway in the 1870s, chose to go for bogie carriages to improve matters. It was, however, a very slow process, not helped by the obstinate conservatism of some influential companies such as the LNWR. Here, the redoubtable F.W. Webb persisted with his outrageous radial truck eight-wheelers until the early 1890s, rather than build bogie coaches. On these vehicles, the inner pair of axles were fixed and the outer pair, each carried on a sliding rectangular frame, moved, theoretically, radially to the radius of curvature.

The absurd characteristics of this form of carriage suspension are now fully preserved for posterity on the West Coast TPO at the National Railway Museum, but in fairness to Webb and the LNWR, most other railways did not get beyond the six wheel stage and even the pioneering Midland had but a few bogie carriages at the time.

If anything at all can be said to have forced a change on the reluctant railways, it was probably a subtle combination of speed and safety plus more and better passenger amenities. As already seen, bogie coaches rode better at speed and the railways were speeding up their services in no uncertain way at the turn of the century. It was also discovered, though not without first wrecking the odd train or two, that bogie vehicles gave far better protection in an accident by virtue of their heavier weight. Lastly, the increasing number of carriages with extra dead weight in the form of lavatories, corridors and the like, put the weight limits to the extreme of the then acceptable maximum axle loadings. The only way to cope with this was to add more wheels, hence bogies. This also gave a useful bonus in the shape of much greater sub-floor space between the bogies into which could be put the ever increasing amount of ancillary equipment ... all of which nicely leads us into the final aspect of the carriage chassis and running gear.



This old view of Holborn Viaduct station on the former London Chatham and Dover Railway c.1880 shows how little the basic carriage forms had either changed or improved during the first fifty years or so of the mechanised railway. The LC&DR was a particularly bad example but sadly, not unique. Incidentally, the six wheel brake with raised 'birdcage' roof was still in service at Reading as late as 1925, by then acting as a 'corpse van'. Photo: NRM Collection

Buffers and couplings

Buffers and couplings are common enough features on all rolling stock and should not need their actual function describing. However, it is worth noting that the adjustable screw coupling and the sprung side-buffer were developed as early as 1830 for the carriage stock of the Liverpool and Manchester Railway. This method remained virtually universal until the turn of the century and commonplace thereafter. It was and is a very good system of connecting vehicles and is still widespread. Its principal drawback is the time taken to 'make' each connection. It is not so much the business of getting the link over the hook but the care with which the tightening is carried out. The aim is to bring the side buffers just into compression thus allowing them to 'damp' any tendency of the vehicle to 'roll' about its longitudinal centre line, also to avoid uncomfortable 'snatches' on starting the train.

Partly to get over this problem and speed up the overall process, by far the more common carriage coupling method today is the centre knuckle or 'buckeye' coupling. Like the bogie, its origins are American and it was first adopted in this country by Gresley on the GNR, well before the first world war. It later became the LNER standard and was widely used by the Southern Railway too, but the LMS and GWR (as had their main pre-group constituents) preferred to use the screw coupling and standardisation was never achieved in

Britain until our present day. Even now (1988) the older fashioned screw coupling is not quite dead, though it should, in all conscience, have been 'seen off' decades or more ago.

The buckeye coupling works by the simple action of propelling two vehicles together on moderately straight track with at least one of the knuckles open. When contact is made, the knuckles spring back behind each other and that's it. If, perchance, the two vehicles are on too much of a curve, then a 'no go' state can exist, while on a more gentle curve it is often helpful to open both knuckles and then propel the vehicles together more vigorously to 'make' the connection — that's when the tea cups usually hit the floor of the buffet car during intermediate re-marshalling. However, this is almost a thing of the past on the modern railways.

Where buckeyed and screw-coupled vehicles have to be connected to each other, the former changes its nature. A pin is 'drawn' from the buckeye hook which is then 'dropped' (i.e. lowered out of the way) to reveal a conventional coupling hook. The side buffers (not needed when two buckeyed vehicles are joined together and, in consequence, normally positioned in what might best be called a 'retracted' position) also need adjusting — to enable them to work when coupled to a conventional carriage, they have to be extended outwards from the carriage headstock. This is done by drawing them out from their housings and then placing a 'collar' on top of the shank to avoid full retraction. When not in use, this collar normally hangs on a chain from a small hook at the end of the headstock. In some cases the whole buffer unit could be hinged downwards to achieve the same effect. It is, of course, the screw coupling from the conventional coach which is then used to complete the connection. This process is, of course, always necessary, when an engine (steam, diesel, or electric) is coupled to any train whose leading vehicle has a buckeye coupling.

Buckeye coupling on the headstock of an almost finished Gresley LNER carriage. The buffers and gangways have still to be fitted. Note the actuating chain for 'opening' the hook. To the right of the actuating lever can just be seen a large split pin holding the coupling hook pin in position. Removal of this split pin allows the main pin to be withdrawn, thus lowering the buckeye hook to allow coupling with conventional stock. Photo: LNER Official, courtesy NRM

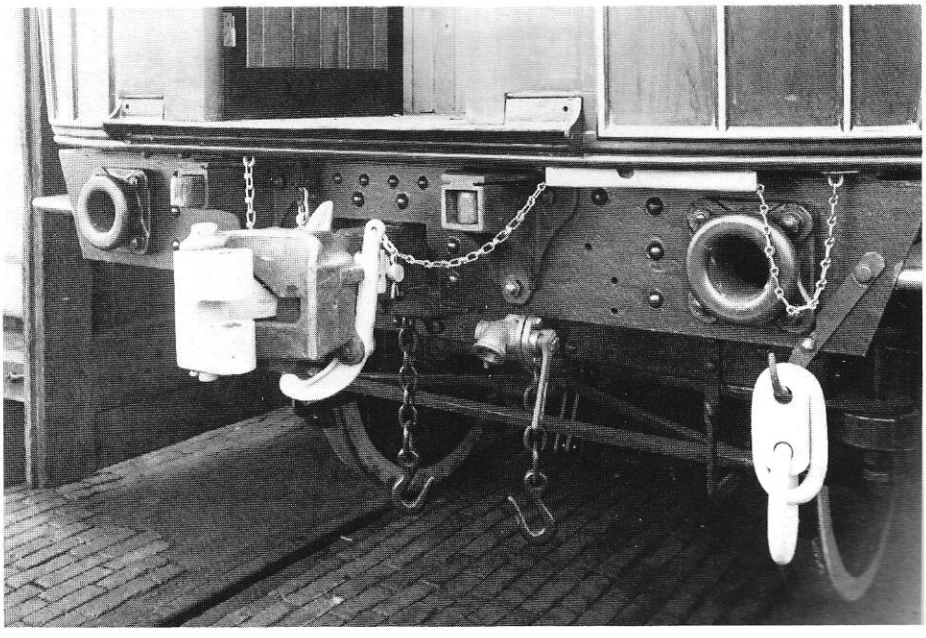
Brakes

At this point, having got our carriages safely coupled together, all that remains to be done is to make the necessary inter-vehicle connections of the various bits and pieces of ancillary equipment. These include steam heating hoses and, sometimes, the electric light connections, but principal amongst them are the brake connections, achieved by means of connecting hoses for the vacuum or air brake apparatus, depending on which type is fitted to the carriage. When connected, the brake hoses, of whatever type, make a continuous connection to the brake apparatus under the control of the driver of the train.

Previous issues of BACKTRACK have described the working of these two principal forms of train braking, so we need not repeat details here, save to remark that severance of the hoses between vehicles, whether by accident or design, brings a 'fail-safe' mechanism into operation. This is achieved either by admitting air into the vacuum system, or by allowing compressed air to escape in the alternative mode; in effect, whichever way was chosen, it destroyed the fundamental equilibrium within the system and applied the brakes to the carriages. But it is worth recording that it was not until 1875 (at Newark) that the railways carried out any serious comparative testing of carriage brakes and it was to be as late as 1892 before the continuous automatic braking of passenger trains was required by law in this country. As an aside, and contrary to popular belief, it is also worth mentioning that when the passenger communication cord is pulled in a train, the brakes are not applied *per se*; the action merely serves to alert the driver to the fact that there is no longer equilibrium within the braking system, thus warning him to stop the train at the earliest opportunity consistent with keeping his train protected by the signals. A genuine brake hose severance would create a far more dramatic effect.

This is still as true today as it has always been, but it must also be recorded that the various British railways could not agree upon a universal system to be adopted for many a long year. The Westinghouse air brake had demonstrated its superiority from the outset both in terms of its quicker acting nature and the generally shorter distance required to bring a train to a halt, but it was also marginally more expensive, being more complex in terms of its equipment. It was, in consequence, only favoured by those lines which had a high proportion of short-run 'stop and start' trains, typically those like the GER and LBSCR with a high density suburban traffic. It also, perhaps surprisingly, achieved a fair degree of popularity in Scotland. In the meantime, many other railways, including most of the long-distance English main line companies, adopted the less efficient, though still very effective, automatic vacuum brake and where through carriages were operated between 'vacuum' and 'Westinghouse' lines, it was necessary to provide 'dual-braked' carriages. These had but one set of brake rigging but this was operated by one of two sets of operating equipment, provided at some expense so as to cope with whatever braking system came their way from the locomotive.

It was not until our own time that this particular form of nonsense was resolved in favour of the air brake. Meanwhile, just as in the case of couplings, so too in the matter of braking; consistency of standards in Britain was bedevilled for almost a century. But it did not stop there; gangway connections between carriages was also inconsistent, again until almost our present day. This, however, is more a function of carriage body design, so it is to this aspect of the subject that we must now turn.



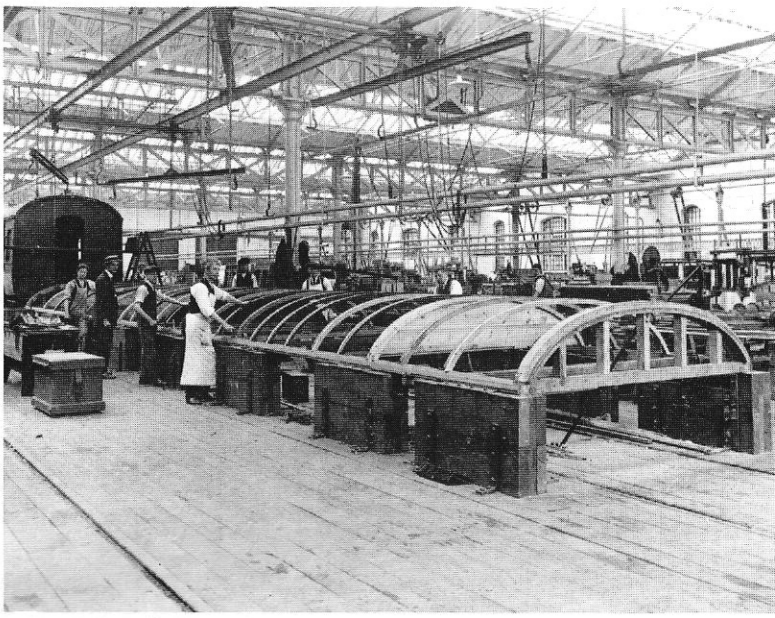
The design and evolution of the carriage body

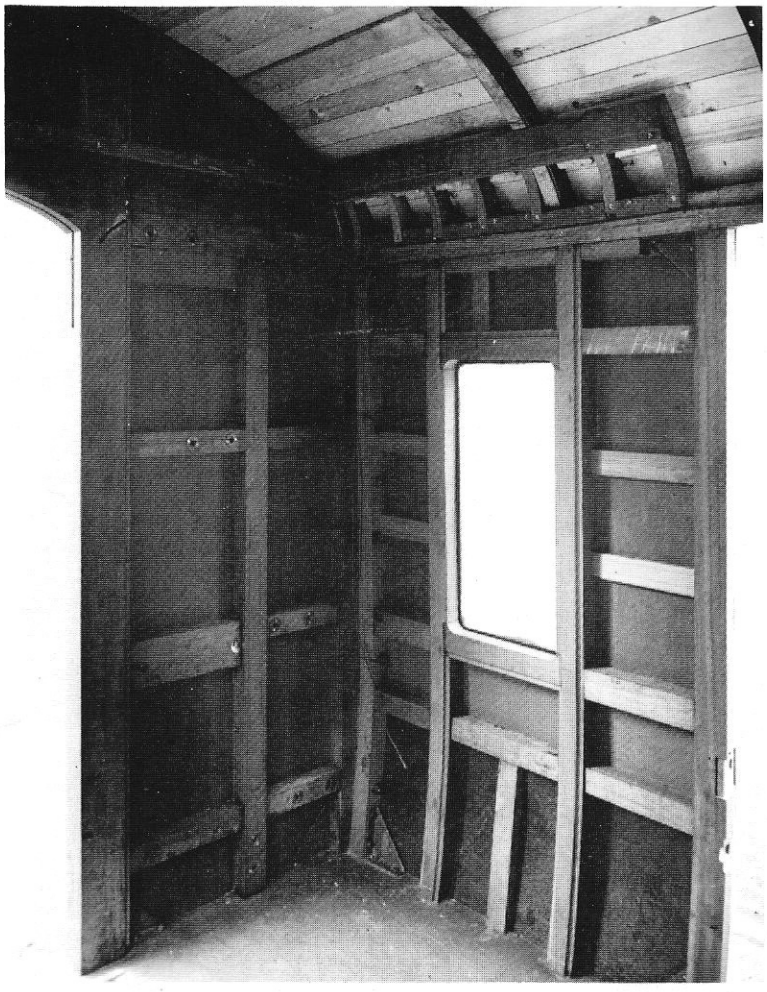
The railway carriage body derives its origins and its first form of construction from the road coaches of the early 19th century. It took much of its terminology from road practice too. Thus 'light' was the word for a window (it let in the light) while the words 'coach' and 'carriage' were already in widespread use anyway. Even the word 'guard' for the man in charge of the train had its origins on the roads wherein the guard of a stagecoach really did just that, often being armed for the purpose.

In essence, a railway carriage is a hollow box mounted on wheels and, apart from a few untypical examples, the basic box began its railway life in the form of three 'stagecoach' style bodies built together as a unit to form a three-compartment carriage. It was

ABOVE: The LMS was one of the first railways to introduce mass-production of carriages, but the form of construction remained very traditional. Here is a Stanier carriage side being assembled at Wolverton in the 1930s. Only the outer steel skin and the larger windows differed significantly from the older all-wood form. Note that in the background the shop is stacked high with finished components ready for assembly. Photo: LMS Official, courtesy NRM

BELOW: Traditional wood framed roof construction at Derby in late Midland Railway days. Note the roof sticks at approximately two foot intervals and the very strong 'arch rail' and support framing at the top of the carriage end. An almost completed body stands in the left background.
Photo: MR Official, courtesy NRM





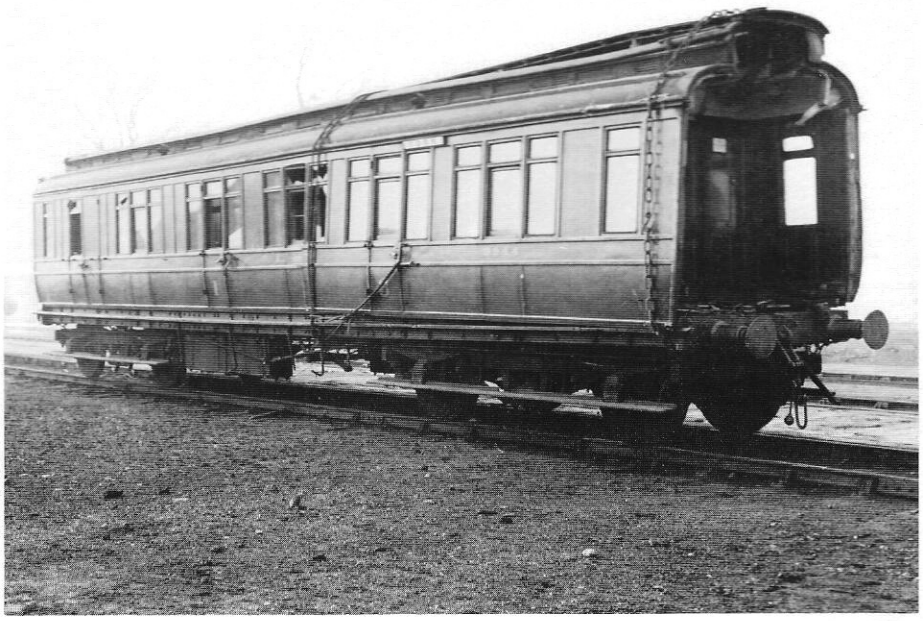
ABOVE: Typical structural framing at the corner of an LMS bogie carriage of the early 1920s. Note the fixed light framing and the close-boarded roof planking.
Photo: LMS Official, courtesy NRM

ABOVE: By the mid-1930s, welded steel framing was becoming more widespread for roof construction. This is an LMS sleeping car under construction at Wolverton in 1935. The strength now lies in the steel roof irons but they still have supplementary wooden roof sticks onto which the interior trim will be fixed. Note too the wooden side framing, held secure to the lower edge of the roof (the cant rail) by means of welded steel brackets and/or 'pockets'.
Photo: LMS Official, courtesy NRM

mounted on four wheels and this remained the norm for far longer than it should have done — there were far better ways of doing things. Almost from the outset, several classes of carriage were introduced — again a hark back to stagecoach days when a differential price structure determined whether you rode inside or on top of the coach.

The first class carriages were most like the old stagecoaches, but since it was clearly dangerous to ride on top of a steam train carriage, an inferior type of box began to appear (for those who did not wish to pay as much), generally with wooden benches rather than upholstered seats and usually with less windows; this was second class. Third class was usually an open topped box, often without any seats at all, but it was very cheap and became very popular. Hereafter, having established the 'start' point, it will be simpler to deal separately with the improved passenger amenities which gradually occurred — they will be covered in the next part of this survey — and concentrate here on the box itself.

The main construction was of wood. Typically a stout timber frame, very much inspired by road coach practice, would be erected to form the basic skeletal form, with openings in the sides for the windows and doors and fitted with interior partitions as required. The frame would be covered on the outside with 'panels', each of the latter usually spanning the gaps between the main frame members. The edges of the panels would then be capped with strips of wooden moulding (or 'beading') to protect the joins. It was, of course, these mouldings which gave the carriage builders and painters scope for much decorative embellishment on the outside



TOP: The elegant Edwardian clerestory style and the distinctive 12-wheel style of panelling of the LNWR are well shown here on a former West Coast Joint Stock composite dining car, built in 1905 but now in use as an emergency messroom during 1942. The form of the British Standard gangway is also clearly seen as are the longer spring hangers on the centre axles of the bogies. Photo: Author's collection

ABOVE: The fundamental structural weakness of the clerestory roof is only too apparent in this early post-grouping accident victim. By far the worst damage is along the roof line. The coach itself, 50ft corridor composite 3944 of Midland and Glasgow & South Western Joint Stock origin, was built in 1900 at Derby. It shows a square cornered variant of traditional British panelling. Photo: LMS Official, courtesy NRM

and in due time, most railways came up with their own characteristic versions.

However, most railways adopted a similar principle for their carriages, dominantly with four separate rows of panelling: below the roof, alongside and between the windows, at the 'waist' and from waist to base of side. Most variations were relatively minor and largely cosmetic, compared with this fundamental consistency. The carriage frame would most likely be made of oak or teak and the panelling was usually from teak or mahogany.

Other timbers were also used, especially for the roof framework where the roof supports between the opposite sides of a carriage needed to be of curved form and thus required 'bending' to shape before installation. This was done by heating in a 'steam bath', then clamping them to a 'bending machine' and allowing them to dry out in this curved configuration. They were known as 'roof sticks' and generally set at some 2ft intervals apart. The extreme end roof stick actually formed the upper edge of the carriage end and thus determined the whole roof profile. Its proper name was the 'arch rail' and was usually made of much more substantial thickness than the intermediate roof sticks. The outer roof itself was normally made from end-to-end boarding, supported by the roof sticks and covered with canvas to act as a weatherproofing material, the whole of the roof boards and canvas being well impregnated with a noxious 'gunge' (essentially a mixture of linseed oil and putty) to help keep out the rain.

During the 19th century, the dominant roof shape was a geometrical arc of a circle but towards the end of Victoria's reign, it had developed a few alternative forms. Most spectacular — and most expensive to build — was the raised 'clerestory' form. It improved light and ventilation but because of its expense, many railways confined it to special carriages only (dining and sleeping cars, for example) but some others, like the Great Western, Midland and North Eastern Railways, gave it more widespread use. The MR (c.1914) was the last to abandon the clerestory for new vehicles but clerestory carriages themselves were a familiar sight until well into BR days. However, the way ahead was to adopt a high semi-elliptical roof form and most companies did this in one way or another during the Edwardian period or soon after. Some railways went through an intermediate stage with a low elliptical form (or 'cove' roof) before going to the full height. The LNWR and LSWR were two such.

Traditional GWR clerestory forms on a South Devon local train c.1923. All four carriages appear to present subtly different variations on the theme and the rear pair still carry the pre-group crimson livery. Note too the much deeper panelling along the eaves of the second carriage — a rather older vehicle. The train engine is Dean Duke Class 4-4-0 3279 *Tor Bay*. Photo: GW Collection, courtesy NRM

By this time, though the basic wooden framework of a carriage body had not changed much in principle since early days, it was getting very much larger and heavier and wooden roof sticks for the new high roof forms were rather more difficult to 'bend' in a single piece than for the old arc roof carriages. In consequence, roof sticks were often fabricated from several pieces of timber and some use of metal strengthening became quite normal. Metal brackets and other similar fastenings had regularly found their place in the carriage builders' repertoire from an early stage but the late Victorian and Edwardian eras witnessed an increasing use of steel angle or T section to strengthen the roof sticks, especially with the clerestory form. These were often known as 'carlines' and materially strengthened the whole ensemble.

It was, from this stage, but a short step to the use of sheet steel to replace the wooden side and end panelling on the carriage exterior. This began at quite an early stage with small pieces of steel plate replacing the old mahogany or teak pieces on a 'one for one' basis, retaining the raised external beading. They only revealed their metallic nature by tapping them. But before going on any further with this line of development, we must first return to the original wooden bodied form and discuss what went on 'inside the walls', so to speak.

Second and final part in next issue

PENMAENPOOL

A Welsh station, erstwhile Cambrian, late Great Western — and its motive power depot

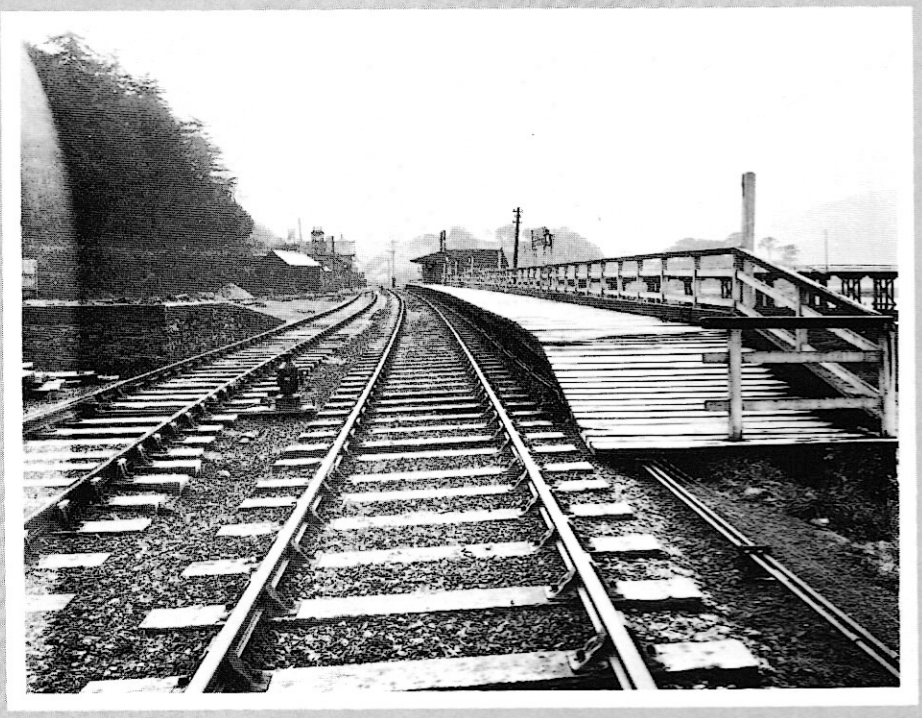
Described by
MARTIN WILLIAMS, BILL REAR & G. K. FOX

Location

Penmaenpool is 2 miles 16 chains west of Dolgellau on the secondary main line from Ruabon near Wrexham to Barmouth on Cardigan Bay. The railway company owned the public road toll bridge over Afon Mawddach, which avoided the long detour to Dolgellau on the through road to Towyn.

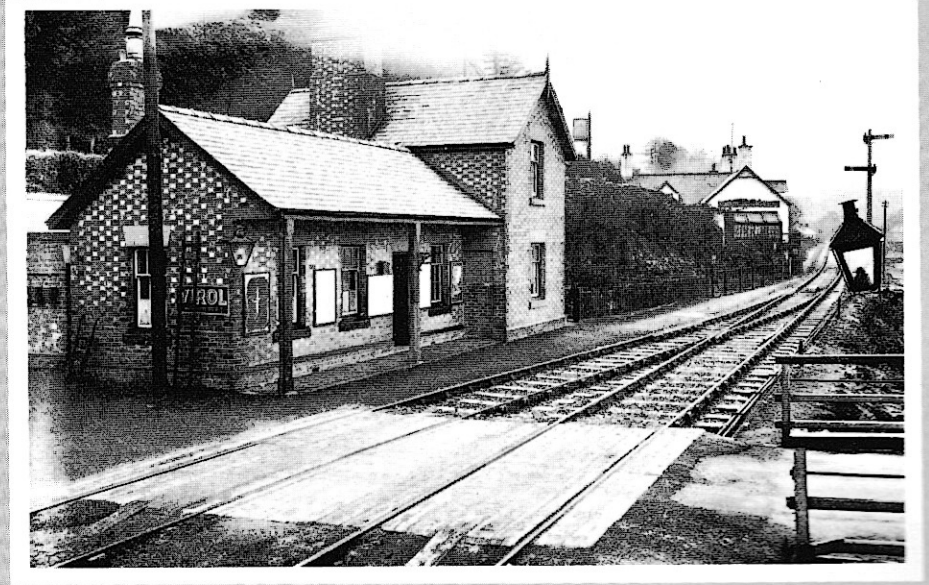
The Line

Although Penmaenpool was located on a through line from Barmouth Junction to Ruabon, the line was, in fact, operated by the GWR as far as Dolgellau, on behalf of the original owners, which it subsequently absorbed. There, it ultimately formed an end-on junction with the Cambrian Railways, who constructed a branch from their Cardigan Bay coast line, opening on 3rd July 1865. The line was single from Barmouth Junction to Dolgellau, although the loop was constructed at Penmaenpool in the earliest days. It seems likely that the stabling of locomotives was intended to be at Barmouth, but this failed to materialise and a small shed was constructed at Penmaenpool with the sole function of feeding the coast line.



ABOVE: Looking from the Dolgelley end of the station c.1925, prior to the remodelling, completed in 1927, of the layout which resulted in the addition of platform and passing loop on the down side. The loading mound on the left was dismantled and a new timber passenger platform erected in its place.

BELOW: Looking the other way at the same date. The crossing served as both foot and level crossing to the toll bridge. These must have been self-disciplined days as there is no protection afforded to passengers leaving the booking hall at ground level. The George Hotel is in the middle distance and the engine shed just visible to the left of the oil lamp. Photos: Author's collection



The Station

According to the Chester Division report to the GWR Directors, written in 1925 by the then Divisional Superintendent J. R. Morris, (based on an earlier work compiled by J. Morris in 1886), Penmaenpool station served the village of the same name and Bontddu, with a combined population of about 800. The public road crossed the railway, but was not protected by gates at this time, and the signalman on duty was instructed to guard the user of the crossing against approaching trains.

In 1925 there was a single wooden platform on the up side with a general waiting room on the platform. The signal cabin was located at the Barmouth end of the platform, adjoining the crossing. The stationmaster's house and a booking office, which contained the block instruments, was located on the down side together with a general waiting room and two lavatories. A passing loop was similarly located on the down side, as were two sidings, with access off the loop line, served by trains from Dolgellau to Barmouth. There was a warehouse and a weighbridge and the station could accommodate horse and cattle traffic. Station staff comprised a stationmaster, class 5, who paid a rent of 3/10d per week for the house, and two signalmen, also class 5. Oil lamps were provided, which were attended to by the

Arthog porter. The traffic receipts for 1924 were:

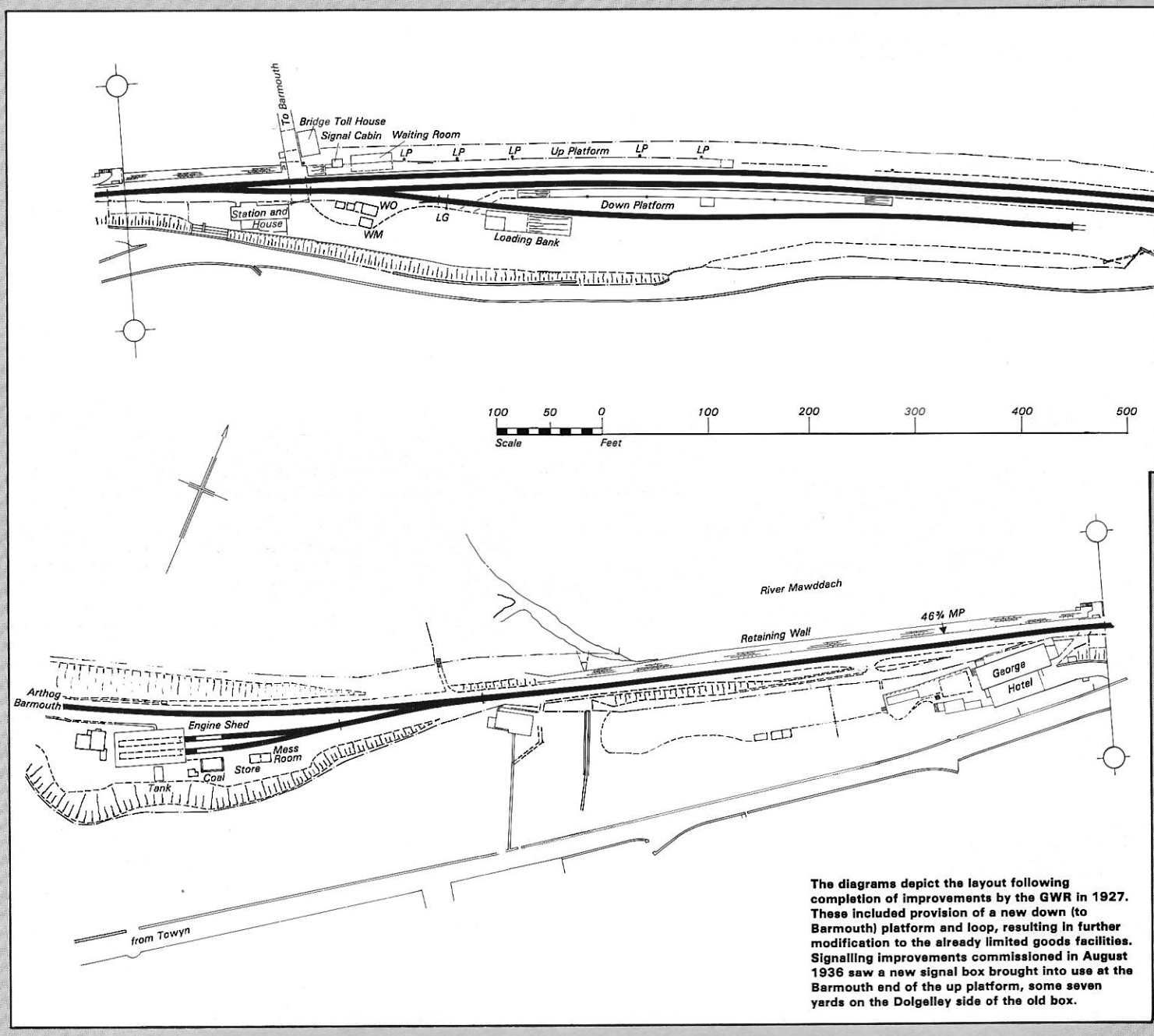
Passenger	£777
Parcels	£277
Goods	£650
Total	£1,704

It is interesting to note that the 1925 report comments that "the arrangements at Penmaenpool are antiquated and as the platform requires renewal, the opportunity has been taken of having a plan prepared for a proper crossing loop with an island platform." In the event, the plans were modified, and the projected island platform was dropped in favour of a second platform on the down side. The date of the alterations is not known.

RIGHT: View from the down side of the wooden signal cabin and waiting shelter provided by the Cambrian. The former, similar to that at Llwyngwril on the coast line, was replaced by a GWR standard type in 1936, about 12 years after this view was taken.
Photo: Lens of Sutton

LEFT: Looking towards Dolgelley on 24th May 1964 from the level crossing at the west end of the station. The track layout here dates from 1927 and the signalling from alterations in 1936 when the lower quadrant types replaced the multi-functional Cambrian varieties.
Photo: C. L. Caddy

BELOW: A view taken about 1963. The signalman on the platform prepares to exchange the items of single line equipment as an up passenger train, possibly for Chester, passes over the level crossing and enters the station hauled by BR Standard 4-6-0 75006. The station buildings are on the left, and the toll bridge is discernible beneath the station nameboard, right.
Photo: C. L. Caddy



The diagrams depict the layout following completion of improvements by the GWR in 1927. These included provision of a new down (to Barmouth) platform and loop, resulting in further modification to the already limited goods facilities. Signalling improvements commissioned in August 1936 saw a new signal box brought into use at the Barmouth end of the up platform, some seven yards on the Dolgelley side of the old box.

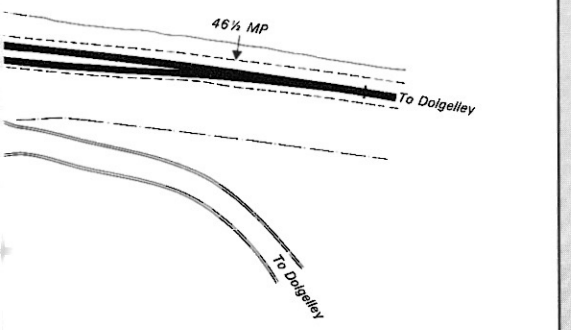
The Locomotive Shed

The above-mentioned Chester Division report noted that there was a locomotive shed on the down side of the line, about 18 chains from the signal box, and also a water column.

Penmaenpool shed, opened in 1869, was originally of timber construction. It is understood that the shed dimensions remained as built when the GWR absorbed the Cambrian system, although the GWR reclad the framing with corrugated sheeting quite early on, probably when they rebuilt Penmaenpool station platforms.

It is likely that the anomaly of Dolgellau station working, whereby there were two stationmasters, two sets of booking offices, etc, was dispensed with as soon as possible, and that this rationalisation also affected the workings of Penmaenpool shed. Formerly all through trains changed locomotives at Dolgellau, but after the amalgamation locomotive and footplate staff could now work through to Barmouth thus eliminating wasteful practices.

PENMAENPOOL



The GWR working timetable for May 1907 showed four trains in the down direction and three in the up direction making connections with less than ten minutes delay in changing locomotives, with no through freight facilities in either direction, trains being marshalled and sorted at Dolgellau according to requirements. Allocations were to the main shed, Croes Newydd, and locomotives would rotate according to the engine working diagram.

In 1925 the allocation was specified in the Chester District report as two engines and one rail motor car. No details are given, but it is likely that the rail motor was either 412, 78 or 91. A photograph in Cambrian Railways Album 2 by C. C. Green shows steam rail car 39 at Penmaenpool in 1924.

The somewhat parlous state of Cambrian Railways motive power meant that, in all probability, GWR locomotives were substituted very early on. Cambrian 2-4-0T 59 *Seaham* was based at Penmaenpool for some time around 1882. A more recent photograph shows Sharp Stewart 0-4-4T 3 on a through train of GWR stock near Barmouth Junction.

After the GWR railcars moved on, local workings between Dolgellau and Barmouth were entrusted to GWR 0-4-2Ts of class 517, working auto trains; 1155 working from Penmaenpool for a while. These were replaced by more modern equivalent versions, the 14xx class. In 1948, 1434 was shedded at Penmaenpool.

It was usual to have two locomotives based overnight for the workings, one of which was an 0-4-2T for the Barmouth-Dolgellau shuttle, and this arrangement persisted almost until the shed closed in 1965. Latterly, the auto train working gave way to the practice of running around the stock at each terminus, with an ex-LMS 2-6-0 class 2 465xx working with two coaches. Most of the other work was covered by the 43xx class 2-6-0 tender locomotives.

It is possible that in early GWR days, when Corwen shed closed in 1927, some work was transferred to Penmaenpool. There were seven sets of men based at the shed for many years, from the early 1930s until the late 1950s. Almost all the work was between Barmouth and Ruabon, although it is understood that for a short period one turn worked down the Cardigan Bay coast line on a Saturday morning with a freight as far as Towyn, where the crew exchanged footplates for a north bound freight from Machynlleth.

Crews signed for route knowledge to Bala Junction & Bala Town, and probably as far as Wrexham. Unconfirmed reports state that some crews worked as far as Chester. Most of the work was on passenger trains.

The shed closed with the line to all traffic from January 1965. Due to the line having been severed by floods the previous month, Penmaenpool men worked as far as Bala, whilst Bala men worked no further east than Bala Junction, and shared the timetabled work at the western end of the line.

LEFT: The shed on 22nd May 1961 with Mogul 6357; although based at Croes Newydd this was a regular on the Ruabon-Barmouth line which is in the foreground in this view toward Arthog. Photo: Michael Hale

TOP: The cramped site of the depot is evident here, as BR Standard 2-6-4T 80080 waits outside the shed. The Penmaenpool down home signal originally shared the same post as the up home and was located at the other end of the building. The water shed is at left; its supply came via a 4" pipe from a nearby stream. Photo: Author's collection

ABOVE: 24th May 1964, and the new occupants of the shed await their duties in the last year of operation; Ivatt 2-6-0 46521 and BR Standard 4-6-0 75021. The corrugated hut served as mess room and stores; note the array of fire irons to the left of 46521. Photo: C. L. Caddy

Train Services

The Cambrian service between Barmouth and Dolgellau in the timetable of 1907 is listed as six passenger trains daily, during the week, with one train on Sunday morning. There was also one goods train, one mixed train and two engine movements between Penmaenpool and Dolgellau. In the down direction, seven passenger trains, one goods train and two engine movements from Dolgellau to Penmaenpool shed are listed, with one afternoon passenger working on Sundays.

The service was slightly better in July 1911 with nine passenger trains between Barmouth and Dolgellau, one mixed train and one goods train; there were three engine movements, two in the morning between Penmaenpool and Dolgellau and one in the evening from Barmouth to the shed. In the down direction, this increased to eleven passenger, (two SO), one goods and two engine workings from Dolgellau to Penmaenpool. The Sunday service was the same. □

A major accident on London's electrified suburban lines

LEWIS READE

Disaster at Barnes

No railwayman holds greater responsibility for the safety of the passenger than the signalman. His intelligence, training and skills are called upon unremittingly. Sometimes a man would fail. History remembers many who did — the tragic figures of Meakin and Tinsley, responsible for Quintinshill, Britain's worst ever railway accident, or James Holmes, who wrecked the Scotch Express when mourning the death of his child.

These three men made the mistake which has probably caused more serious accidents than any other — they had forgotten they had a train standing near their box and accepted another on the same line. In an attempt to prevent this, the Sykes Lock & Block system was developed in the early years of this century to ensure that, in signalling trains, all the signalman's operations were carried out in the correct sequence and that adjacent signal boxes in a manual block section interlocked positively.

But like all 'fail-safe' systems, the Sykes Lock & Block required an 'opt-out' facility; the signalman must never be *entirely* prevented from putting *any* signal to danger. Hence the introduction of a release key which enabled a signalman to over-ride the system, thus proving yet again that a completely infallible system is unattainable. Since its introduction, and despite elaborate and stringent regulations governing its use, misuse of the key has resulted in several collisions, including the Southern Railway's worst ever accident, at South Croydon on 24th October 1947 in which 32 died. Less well known is the very similar disaster which took place at Barnes on 2nd December 1955.

Barnes station was, and still is, situated on the four-track 'Windsor' line in the Western Section of the Southern Region. All running lines — up local, up through, down through, down local — were electrified by the third-rail 650v system. Traffic was heavy. In the mid 1950s, multiple unit passenger trains for the inner and outer suburban routes in the Thames valley and for the Ascot and Reading line peaked at 14 up and 19 down at Barnes Junction in the busiest hour of the evening traffic. There was also substantial freight, especially during the night — a constant flow of steam hauled exchange traffic between the SR, LM and ER, via Kew and to and from Feltham marshalling yard.

At the 'country' end of Barnes station, the four tracks divided into two double lines, for Chiswick (right) and Richmond. Between the up and down through lines, close to the ramp of the island platform, was sited Barnes Junction signal box. Of brick and timber construction, it was roomy and well arranged, providing its signalmen with an excellent view of the junction to the west. To the east, however, visibility was limited, with trains standing at the down home signals, in particular, being out of sight.

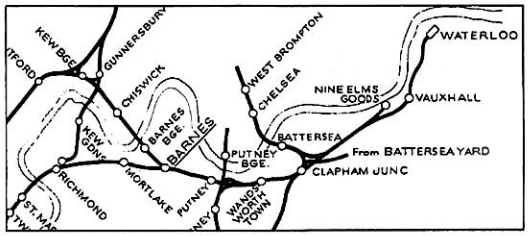
To the east, the running tracks between Waterloo and Clapham Junction were controlled by multi aspect colour light signalling with continuous track circuiting and no manual block. But manual block remained in force beyond Clapham Junction 'A' box on the four-track Windsor lines, and Sykes Lock & Block was in use through the section from Clapham Junction 'E' box to Barnes Junction and beyond.

The night of 2nd December 1955 was fine and clear. The rails were dry. A moderate wind was blowing steadily from the south-west. Inside Barnes Junction box the booking lad who kept the train register had completed his duties at 9.10 pm and 50 minutes later the signalman changed shifts. The 31 year old railwayman who took the duty, alone, from 10.00 pm was subsequently judged to bear responsibility for the tragedy of the night, so we will refer to him here as Smith, not his real name.

Smith's success in the block signalling exams marked him as a man of intelligence, but his practical application was less sure, and not marked by the steadiness of character essential to his profession. He had already been disciplined for irregularities in block working and in the later opinion of the accident inspecting officer, Smith should not have been put in "a position to fail."

On that December night, the sequence of events which were to culminate in disaster began just before 10.00 pm. A temporary power failure resulted in serious disruption to services, and Smith immediately found himself working a busy junction under even more pressure than usual, many trains running out of regular order and passing his box every few minutes as he constantly improvised crossing movements through the junction.

At about 11.00 pm, the signalman at Clapham Junction 'A' box was offered a steam-hauled freight train. The 10.55 Battersea-Brent comprised 42 4-wheeled wagons and a 20 ton brake van and was being worked back to the LMR by LMS 8F 2-8-0 48750 with Driver Nield and Fireman Feltham on the footplate. The train was originally booked to run on the through line, but the 'A' box signalman had only a short margin behind it on the down through, due to the late running caused by the power failure an hour before. Accordingly — as he was quite entitled to do — at 11.04 he ran the freight forward on the down *local*. The next train due on that line was the 11.12 pm Waterloo to Windsor and Chertsey, an electric passenger due to leave Clapham Junction at 11.19. The 'A' box signalman judged that the full 15 minute margin on the freight was more than adequate. In this, he was quite correct. But now things began to go wrong.



The freight proceeded towards Clapham Junction 'E' box, which sent 'train entering section' forwards to Point Pleasant box at 11.07, and the signalman there, J. W. G. Davis, offered it forward to his opposite number at Putney. Putney box, however, refused the freight. Its signalman was in the process of switching his box out of circuit as he ended his shift — before he was authorised to do so, as the enquiry was later to discover.

On receiving Putney's closing signal (7-5-5), Davis carried out the switching procedure to establish block section from his box west to Barnes Junction and then offered the signalman there, Smith, the freight. It was accepted at once and Davis cleared his local starting signal.

The 8F passed Point Pleasant box and commenced a clear run on the almost level two mile section to Barnes. The Barnes Junction distant, however, stood at caution and the home signal, No.49, was at danger. Nield brought his train to a stand at the home and remarked to his fireman that this was unusual — it being normal practice for a train to be held at the platform starting signals to await a path across Barnes Junction. The time was now 11.18.

After a short time, Nield sounded his whistle, in accordance with the rule, to warn Signalman Smith of his presence. But, despite the fact that the 8F was only a few hundred feet from his box, Smith did not apparantly hear the whistle — lost, perhaps to the rising wind. Preoccupied, overstretched and alone, he now made a fatal mistake.

The 11.12 from Waterloo to Windsor and Chertsey was made up of two identical two-coach suburban units, each comprising a 30-ton driving trailer third, leading, and a 42-ton motor brake third. The underframes and bogies were of steel and dated from 1935-36, but the bodies

ABOVE: 3rd December 1955, the morning after. In the foreground is the underframe of the leading coach of the electric, with the remnants of the freight train beyond. The other three vehicles of the passenger train were virtually unscathed, the rearmost two-coach unit staying on the track. Barnes goods yard is at left and Barnes station is in the background. When the collision occurred, the freight was on the down local line (here occupied by S15 30500 hauling an inspection saloon) and its 8F engine was under the bridge in the distance. Just the other side of the bridge was Barnes Junction signal box; it was demolished sometime prior to 1962 and its footings can just be discerned in the view of Barnes Junction published on p.26 of Vol.2 No.1 of BACKTRACK.

BELOW: Scorch marks are clearly visible on the bridge carrying Queens Ride in this 3rd December view looking towards Barnes station. One bogie from the leading coach, which came to rest immediately under the bridge, is visible.
Photos: BBC Hulton Picture Library

unlock the plunger and clear the down local starter, signal No.42, for the electric passenger train. On the same line, the 617 ton, 320 yard freight barred its way.

At about the same time Smith cleared his home signal and immediately the 8F eased forward. At 11.25½, Signalman Davis at Point Pleasant watched the 11.12 pass his box at about 45 mph and sent 'train entering section' forward to Smith. The freight was now under way, but the electric was overhauling it rapidly.

At the electric's controls, Motorman Flanders sighted the distant signal at caution and shut off power, his speed dropping to about 35 mph. But the Putney down local had signalled a clear section ahead and with the Barnes Junction down local also at green, Flanders — whose train was not booked to stop at Barnes — had no reason to suspect that all was not well. He probably spotted the tail lamp and two side lamps of the freight ahead, but the right hand side lamp of the brake van had not been changed from red to white, in accordance with rule 21, to indicate that it was running on the local line, so Flanders was almost certainly unaware that the freight was in his path until it was almost upon him. It was now 11.28 pm.

Motorman Peters, travelling on duty as a passenger and booked to take the rear two coach unit forward to Windsor from Staines, suddenly felt a severe juddering which he recognised as emergency braking or release of the dead man's handle — at the same instant there was a violent impact and he was thrown across the compartment.

The collision occurred close to bridge No.21, which carries Queens Ride over the railway, some 360 yards from Barnes Junction box. The steel underframe of the leading coach reared up over the frames of the goods brake van, shattering the latter's body, demolishing a container loaded on the last freight wagon and coming to rest on its side on the down through line. Flanders and the freight train guard were killed outright.

originated as steam-hauled stock of 1895-1900; little changed since the days of the Victorian railway, they were constructed almost entirely of wood, a fact soon to have tragic consequences.

As the train approached Point Pleasant box from Clapham Junction at about 11.23, Signalman Davis offered it on to Smith at Barnes Junction. Smith's Lock & Block system was showing the 'train on' indication which protected the freight standing at his home signal. What happened next was disputed by Smith, and the account which follows is taken from the conclusions of the official MoT report.

Smith had either forgotten the freight or had no clear idea of where it was. Alternatively, he may have assumed that he had forgotten to 'key out' the Lock & Block instrument after Putney box had switched out. Perhaps he believed that the equipment was faulty, for faults did occur. Whatever his thinking, he ignored the strict procedure laid down before 'train on' could be cleared and used his release key to

On the footplate of the 8F, moving at walking pace, the crew felt a heavy jolt and Nield was bruised; his fireman, stunned, looked back and saw sparks and flames shooting from the rear of their train. Nield applied the brake, climbed down from the cab and shouted up to Smith in his box. Receiving no response, he rapidly mounted the steps. Inside, Smith was writing and seemed to have no inkling of disaster. Nield told him of the collision and fire and the signalman, dumb-founded, put all his signals to danger and began to 'ring' his instruments.

The electric train guard, W. E. Jeffery, was bruised and shaken but re-lit his handlamp and went back some 300 yards to protect the rear of the train. As he did so he heard a loud explosion and saw violent flashes under the bridge.

At Barnes Junction and Clapham Junction substations the circuit breakers governing power to the conductor rails were opened by the collision and the current was immediately cut off from the down *local* line. The down *through* circuit breaker at Barnes Junction also came out at once but the resulting short circuit was insufficient to open the down through circuit breaker at Clapham Junction and current continued to be fed into the down through line from Clapham Junction. Its live conductor rail was scattered with metal debris from the collision and after a minute or two electrical arcing began, almost at once igniting the wooden body of the leading coach and the shattered remains of the freight brake van. Detonators began to explode, oil lamps caught fire and the coals from the brake van's stove ignited the wax paper and cardboard packing of aircraft aerials spilled from the wrecked container on the last wagon.

Motorman Peters was helping to extricate a passenger pinned under the leading coach when the arcing commenced. He ran at once to the motorman's compartment at the rear of the second coach and fetched a short circuiting bar; this was promptly burnt through as he attempted to get it across the down through conductor rail and the adjacent running rail. He found another and this time managed to get it firmly across. His courageous action opened the down through circuit breaker at Clapham Junction and the arcing ceased at 11.34. But by then, fanned by the prevailing wind, the fire was out of control, flames leaping high above the bridge as they consumed the wrecked leading coach.

Meanwhile, at Barnes Junction box, Signalman Smith had compounded the tragedy of the night. Not fully in command of the situation *before* the accident, he was now shocked and confused. At 11.33 he ran to the public call box on the down local platform and dialled 999. When the exchange answered, Smith said: "Quick, I want the lot — fire, police and ambulance!" He was promptly connected as a matter of priority to Barnes fire station but, inexplicably, he then asked only for an ambulance and gave no clear indication then, or in a second agitated call a minute later that a railway accident and fire had occurred.

It was left to a resident close to the line to phone the fire service at 11.40, no less than 12 minutes after the collision. The appliances turned out promptly but by then the intensity of the fire made rescue work impossible. In the burnt out wreckage of the leading coach, eleven passengers died. Together with the motorman and freight train guard, this brought the death toll to 13. 20 more passengers were seriously injured and 21 others sustained minor injuries.

The two up lines were not blocked by the accident but were kept clear for breakdown operations; interruption to traffic was therefore total. The up local and down through lines were reopened to traffic at 11.12 am on the following day, a Saturday, the down local being reinstated at 5.48 pm.

The official investigation, as ever, was exhaustive. The unfortunate Smith did not admit to error but his suggestions of mechanical failure in signals and the Sykes Lock & Block system were disproved by tests. The inspecting officer was satisfied that the electric train had entered, under clear signals, the section still occupied by the freight and the responsibility rested with Signalman Smith who had improperly over-ridden the Sykes Lock & Block apparatus.

But Lt Col Wilson made recommendations. The Sykes system was judged to have considerable merit; accidents had been caused by its misuse but, when worked in strict compliance with regulations, it had prevented many more. However, it was old fashioned in design and operation and Wilson recommended that Southern Region manual signal boxes, of which Barnes Junction was then one of the busiest, should be converted with all possible speed to incorporate modern colour light signalling and continuous track circuiting. The failure of the circuit breakers after the accident was similarly the symptom of outmoded equipment, and the 13,900 wooden passenger coaches in BR stock at the end of 1955, one of which had so heightened the scale of the tragedy, were expected to be replaced entirely by new steel bodied vehicles within 7 years.

All these contributing factors: outmoded design in signalling, track circuiting, power supply and coaching stock construction, were to be very largely swept away as BR's Modernisation Plan, then under way, gained momentum. The disaster at Barnes, one of the last major British railway accidents in which fire played a role, marked the beginning of the end for several key aspects in the operation of an intensive electric suburban service.

But as BR Southern Region entered a new and unquestionably safer age, the new technology would not, and could not, neutralise the weakest link in all transport systems — the eternal human capacity to fail. □

DESCRIPTION OF THE SYKES LOCK AND BLOCK SYSTEM OF SIGNALLING, AS USED IN THE WESTERN SECTION, SOUTHERN REGION IN 1955.

(1) Each signal lever is connected by rodding to a Sykes' instrument above it, which shows two indications, LOCKED or FREE. When the signalman is offered a train from the box in rear, he can accept it by pushing in a plunger which is a part of his home signal instrument. This action frees the starting signal of the box in the rear, and changes the lower tablet of his own home signal instrument from blank to TRAIN ON. The plunger then becomes locked. The upper tablet of this same instrument indicates FREE as the line is clear to the starting signal.

When the home signal lever is reversed, the upper tablet changes from FREE to LOCKED and remains in this position until the starting signal lever has been pulled and replaced following the operation of the treadle in advance of that signal. When the train has passed the home signal, the replacement of the home signal lever restores the lower tablet from TRAIN ON to blank, but the plunger may remain locked until the upper tablet changes to FREE on the replacement of the starting signal lever as described below.

(2) The instrument associated with the starting signal normally shows LOCKED, and in this position the connecting rod is raised and the signal lever locked. The rod is held in this position by a permanent magnet and detent in the instrument. When it is required to send a train into the block section, the appropriate bell signal is sent to the box in advance. If the signalman at that box is in a position to accept the train he pushes in the plunger on his home signal instrument. This action completes an electric circuit, which, by means of a coil winding in the instrument of the starting signal of the box in rear, neutralises the permanent magnet, and so allows the lock rod to drop. This frees the starting signal lever and gives the FREE indication in its instrument.

The starting signal lever is then pulled, changing the indication in the instrument from FREE to LOCKED, and the lever becomes backlocked until a treadle (or track circuit) ahead of the signal has been actuated. The depression of this treadle by a train completes a circuit to release the backlock on the lever of the starting signal and changes the indication in the instrument from LOCKED to FREE. When the starting signal lever is replaced, it again becomes frontlocked and cannot be freed until a second release is given by the plunger at the box in advance.

The effect, therefore, of this rotation locking is that each train should pass through the block section, and beyond the starting signal, before a second train can be accepted.

(3) In addition to the locking between the plunger and the signals, a block indicator, electrically controlled from the box in advance, is mounted over the starting signal instrument. This indicator takes the form of a miniature semaphore arm, which is normally in the raised position. The arm is lowered when a train is accepted, and it is raised again when the "Train Entering Section" is acknowledged.

The control of the indicator by the box in advance is effected by a switch hook associated with the plunger. The switch hook, when turned over the plunger, serves as a physical reminder that the plunger is not free to be pushed, and maintains the indicator at the box in rear in the raised position. When the signalman is offered a train which he is in a position to accept, he turns the switch hook to the right away from the plunger, so completing an electrical circuit to lower the semaphore indicator at the box in rear. When "Train Entering Section" is received, the switch hook is replaced over the plunger to raise the block indicator.

(4) A key is provided for re-setting the plunger mechanism if a train should not proceed through the section after acceptance or be shunted out of the section between signals, or again after a release has been given to the box in rear to enable it to close out; the action of the key in the plunging instrument changes the lower indicator from TRAIN ON to "blank", and enables the plunger to be used again. The key can also be used to release the rotation locking and to release the instruments if the treadle or the pulling and replacing of the relevant signal levers should fail to do so. The key cannot be used to release the front locks of section signal instruments.

Source: MoT Report into the Accident, HMSO, 1956

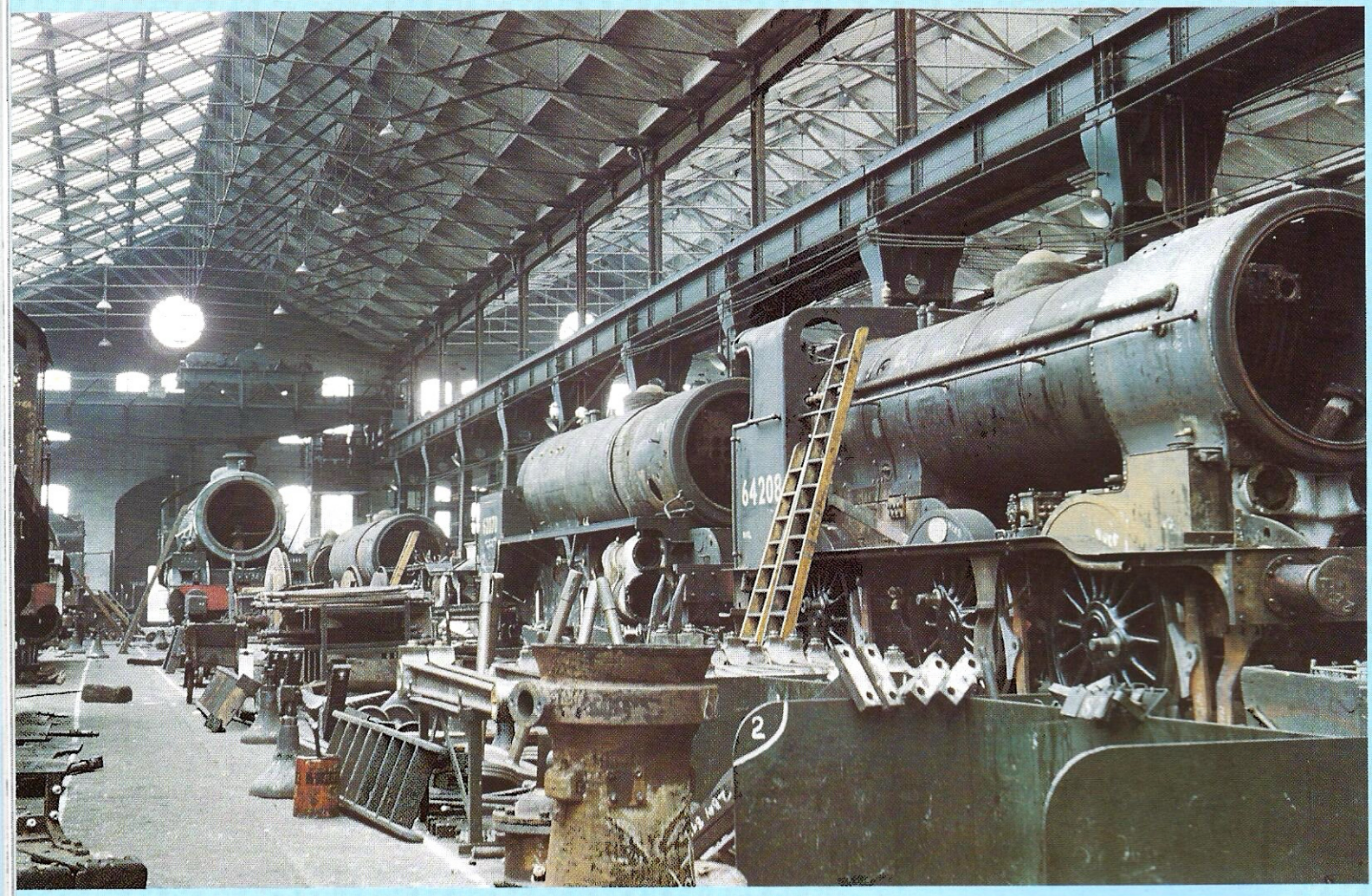
ABOVE: That the 2m 1ch Brixham branch opened on 28th February 1868 was due almost entirely to R. W. Wolston who subscribed 98% of the shares. Sold to the GWR in 1883 and relaid to standard gauge in 1892, the line was worked by small tanks, latterly of Class 14XX, which took some 7 minutes to work through from the junction at Churston. There was considerable fish traffic and, in the 1950s, ten passenger services plus Saturday extras. This 16th June 1959 view shows 1452 at the terminus, which was inconveniently (but unavoidably) sited high above the town at Furseham. Photo: W. Potter

WESTERN LOCALS

Steam push-pull and diesel railcar services

BELOW: Diesel railcar W19W at Dymock on 30th May 1959, some six weeks before passenger services were withdrawn from the Gloucester-Ledbury branch. Dymock and Newent were the intermediate stations on the 12¾ mile line and both had crossing loops. The GWR/AEC railcars worked here from 1940, the year of No.19's construction. After closure to passengers, freight continued to run north on a truncated section to Dymock until June 1964. Photo: Dave Soggee

See also front cover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Two days at DONCASTER

10th May 1959

ABOVE: A rare colour portrait of a 'Baby Deltic' in as-built condition. D5906 had entered traffic the previous month, along with five sisters in the ten-strong class. These 1110hp English Electric Type B(2) mixed traffic diesel-electrics utilised the Napier Deltic T9-29, a sophisticated power unit designed for high speed running. Its use in a mixed traffic type destined for considerable low speed work was ill conceived and despite extensive engine modifications at EE's works the class was short-lived and ill-regarded by operating staff.

The smart original livery seen in this view at works did not last long, the off-white body stripe being replaced by one of grey-green; small yellow warning panels were added and later extended around the locos' ends. Only one 'Baby Deltic' received blue livery, D5909, and all had gone from traffic by March 1971.

LEFT: The North British 200hp diesel-hydraulics of Class DY11 were developed from an industrial design and utilised German transmission manufactured by NB under licence. The diminutive 0-4-0 shunters were not a success. 11702, seen here in works for attention with its rods tied on with rope, was one of a trio ordered by BR in 1953; the other five in the class were delivered in 1955-6 and had differing bonnets, oval buffers and redesigned cabs. The DY11 became extinct in 1968.

20th April 1958

Photographed by **W. POTTER**

LEFT, TOP: Crimpsall Erecting Shop was added to Doncaster Works in 1901. This interior view shows locomotives undergoing heavy repairs; Gresley Class J6 0-6-0 64208 is visiting from Ardsley and the Peppercorn Class K1 Mogul, 62070, sent from March depot, will re-allocate to Stratford when it leaves 'The Plant'.

LEFT, BOTTOM: At the running shed on the same day, another March engine, Class K3 61826, is looking immaculate after recent overhaul. These Great Northern 3-cylinder mixed traffic Moguls, designed by Gresley, were then still intact as a class and widely allocated on the North Eastern Region, but all had gone by the end of 1962.

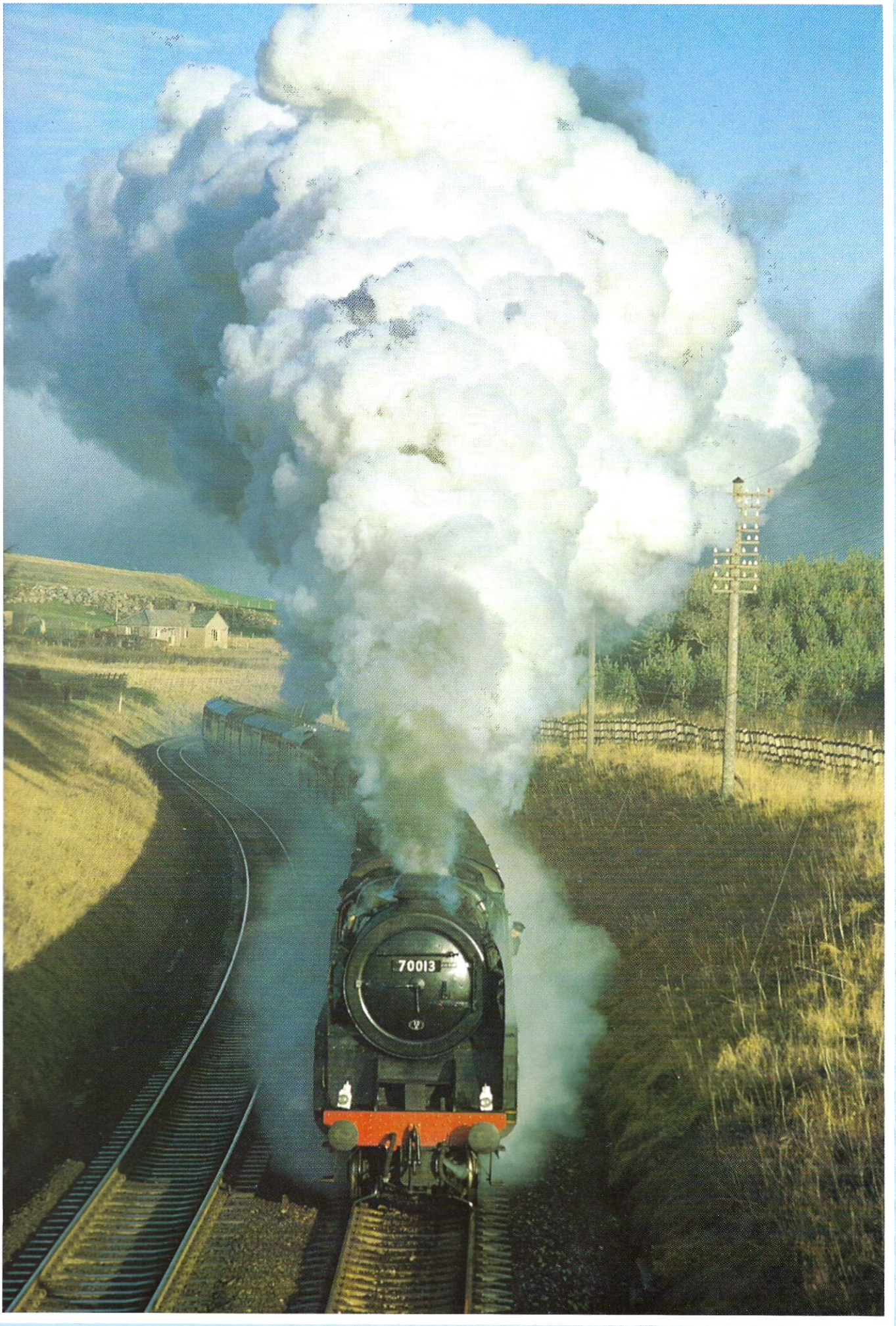
TRUE BRITS

Standard Britannia Pacifics in action on the LMR

BELOW: 70021 *Morning Star* **moves slowly up the yard at Willesden shed on 9th October 1963. At this date, 1A was home to no fewer than 14 Britannias. All but two of these had arrived that spring, six transferring from March on the Eastern Region where they had been displaced by English Electric Type 3 diesels. By the following January all the Standard Pacifics were on the LMR.** Photo: Geoff Rixon

BOTTOM: Looking south from above the portal of Sough Tunnel on the L&Y Blackburn to Bolton line on 19th March 1967. 70015 *Apollo*, **carrying a non-standard unlined green livery and painted nameplates, is working a circular RCTS railtour commencing and terminating at Manchester. The engine was condemned that August. This steeply graded stretch of line is today singled.** Photo: Peter Fitton

RIGHT: On Boxing Day 1967, 70013 *Oliver Cromwell* **was turned out by Kingmoor MPD to work a football supporters' special leaving Carlisle at 9.45 am. This proved to be the last steam hauled passenger train to work over Shap and 70013, suitably groomed by enthusiasts, rose to the occasion. The Pacific is seen here making a spectacular climb near Shap village as it heads for the summit, unassisted, with 451 tons on the drawbar. The following month, 70013 became the last steam locomotive to receive a major overhaul at Crewe Works and was returned to traffic with ceremony. The last Pacific in regular BR service, it was withdrawn in August 1968.** Photo: Paul Riley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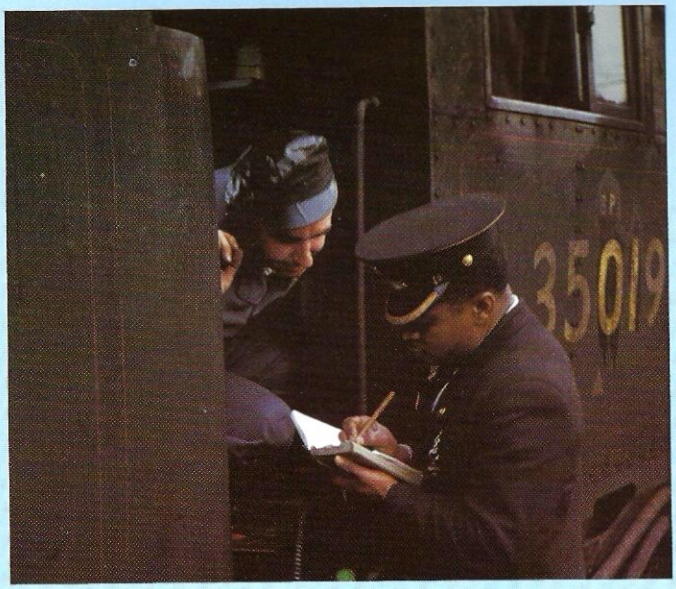
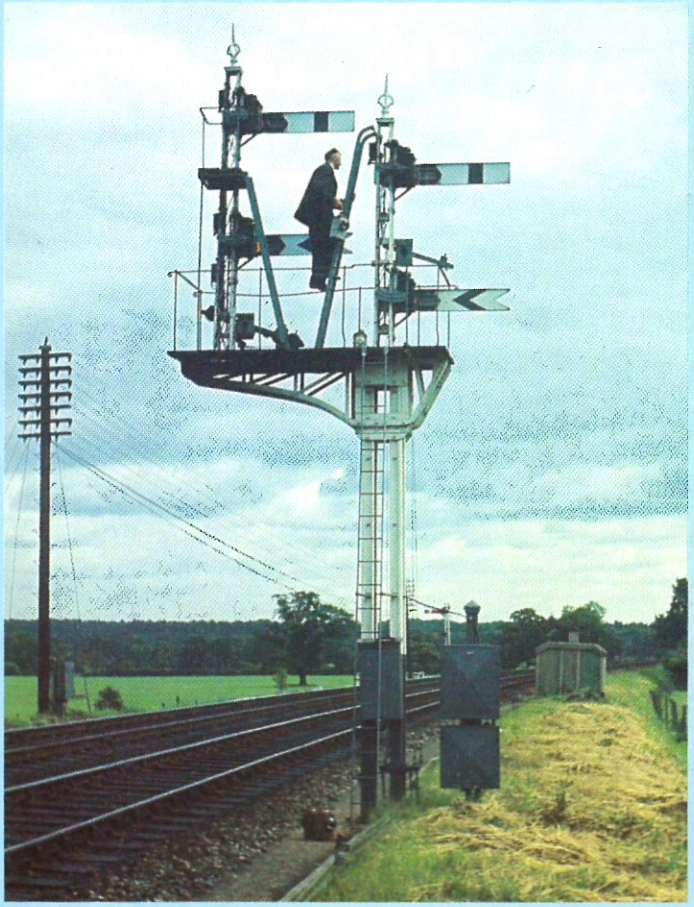
ABOVE: The rear of Three Bridges running shed in May 1963. This depot was situated in the fork of the Horsham and Haywards Heath lines, south of Three Bridges station, the junction for LBSC lines east to East Grinstead and west to Horsham. The two Billinton Class K Moguls are withdrawn, victims of the mass condemnations of steam on all regions at the end of 1962. The Ks were the only SR Moguls not designed by Maunsell to survive into the 1960s and a number were allocated to Three Bridges. 32345, 32349 and 32353 were all stored there and cut up at Eastleigh Works. Standard 4MT 2-6-4T 80141 is visiting from Tunbridge Wells West and a SECR Class H 0-4-4T is at left. The steam crane was used for coaling locomotives. Photo: Roy Hobbs



ABOVE: The rural and greatly mourned Meon Valley line was opened in 1903 and closed to passengers just 52 years later, its short, humdrum existence a reflection of commercial pointlessness. Built primarily to keep the GWR out of LSWR territory, it was also intended as an alternative through route to Gosport and Portsmouth. This dream was never realised and the engineering provision for double track, grandiose station buildings and lengthy platforms provided an atmospheric setting for sparsely patronised two-coach locals which plied between Alton and Fareham. West Meon, seen here in 1975, was very similar to the other four original stations on the line, red brick with stone door and window surrounds. The haunting atmosphere of the disused station is evident. Photo: Jeffery Grayer

LEFT: Waiting at Waterloo, the Nine Elms driver of Merchant Navy Pacific 35019 *French Line CGT* **gives the guard particulars of his train, the 5.30 am Waterloo-Bournemouth West on 28th September 1963.** Photo: J. D. Gomersall



Variety on the SR, with reminders of the human side of the steam railway

LEFT: Another of the myriad of simple, everyday tasks on the steam railway, whose execution was rarely photographed: changing the lamp on the down line semaphores at Brockenhurst, 5th July 1965. Photo: J. D. Gomersall

BELOW: The eight mile branch to Sidmouth in Devon originated as a local company authorised in 1871 and opened three years later. In 1876 it was absorbed into the LSWR by which company it had always been worked. Sidmouth is a prestige holiday resort with, it is said, more four-star hotels in relation to its size than any other south coast resort; this did not prevent closure of the branch in 1967 after Dr Beeching's plan of execution and under WR influence. Here, the signalman has left the rose bedecked signal box to collect the single line tablet from the fireman of LSWR Class M7 0-4-4T 30044 on the 12.30 pm from Tipton St Johns, 24th July 1958. Photo: R. C. Riley

Southern Selection

SCOTTISH SCENES

RIGHT: The signal box at Inverurie on 11th September 1974, a good clear study of a Great North of Scotland design. The signalman has laid in ample stocks of coal for his stove. Photo: S. C. Dent

BELOW: The foothills of Ben Nevis form a backdrop as Class K2 61794 *Loch Oich* turns on Fort William shed table in July 1959. Many of the 13 named engines in the class were familiar on the West Highland line. 61794 was the last to be built, in September 1921; named in 1933 and fitted with side window cab in 1934, it was withdrawn in July 1960. Class K1/1 61997 *MacCailin Mor* was a 1945 rebuild of K4 3445, differing from production K1s in having a continuous front footplate. Photo: K. R. Pirt/K. R. Photographics

RAILS IN THE DURHAM FELLS

ALAN EARNSHAW *describes the railway development of Weardale. Today almost entirely dismantled, the lines grew in profusion, principally to exploit mineral resources*

TOP: Hownes Gill Viaduct with LNER Class D20 4-4-0 1042, off Darlington shed. The normal three coach rake of one clerestory coach and two 'birdcage' brakes has been complemented by another clerestory, possibly indicating a Saturday train.

ABOVE: Snowbound trains at Rowley on 29th January 1910. At 6.53 pm on the previous day the 6.26 Blackhill-Darlington train was halted at Cold Rowley as the line ahead was blocked by snow. 0-6-0 915 was despatched to assist but also became stuck at Rowley. Photos: North of England Open Air Museum, Beamish (NEOAM)

Geography and geology

For the past two centuries the name of County Durham has been synonymous with heavy engineering and coal mining. It is also, of course, associated with the birth of commercial railways, in the form of the Stockton & Darlington Railway. This pioneer spread westward from the River Tees into the heart of the Durham coalfield, and had its most westerly terminal at the mining village of Witton Park on the edge of pastoral Weardale. Here the coalfields end, and the broad valley of the River Wear pierces the heart of the North Pennines, a vast and remote moorland area where one might assume agriculture to be the sole industry. A visit to the area, however, would provide evidence that suggests otherwise, for every turn of the valley reveals the trace of two major industries and the railways that were built to serve them.

This part of the North Pennines is predominantly limestone, with hilltops capped with namurian rock or 'millstone grit'. In the limestone, which is up to 900ft deep in its layers, are found a wide variety of semi precious minerals formed during the earth's creation. These include silver, copper, zinc, iron and lead, along with which are discovered fluorspar, baryites, galena and quartz. Even the base limestone has considerable value for use in processes from building to steel making. Consequently, the dales and fells of the North Pennines are rich in the remains of the mining and quarrying industry, once one of the most extensive orefields in the country.

Origins of the railway

The area has been exploited for centuries, possibly since Roman times, but it was the developments of the 18th and 19th centuries that really brought the area to prominence as new technology became available, and this was particularly so in the field of transport. Prior to the advent of railways the only way to transport the heavy ores was by pack ponies. These were known locally as 'galloways', and operated in 'trains' from the mines and quarries to the processing plants. Many of the early lead mines and iron ore workings had primitive wagonways for moving ore internally, but the 'tubs' on these were usually hauled by boys, though in some cases horses were used. The developments on the nearby Stockton & Darlington Railway were of tremendous interest to the iron-masters and mine owners of Weardale and approaches were made to the S&D with a view to extending their line up the dale. These early discussions were not successful but the seeds of an idea had been sown.

Extensive iron deposits had been located at Carr House near to what is now the town of Consett, and a steel making plant had been established in the early 1800s. The process of turning iron ore into high quality steels required copious amounts of lime, which was not found locally in the quantity required, and the nearest supplies lay over the

moors in distant Weardale. A railway was the obvious answer, but the Wear-Derwent watershed is over 1300' above sea level and no railway had ever been taken over such terrain. Undaunted by this a number of speculators proposed a railway to link Carr House to Stanhope in Weardale, via Waskerley Moor. A number of lime kilns were already operating at Stanhope and there was scope for more at nearby Crawleyside, where it was proposed that the new railway would terminate.

The Stanhope & Tyne Railway

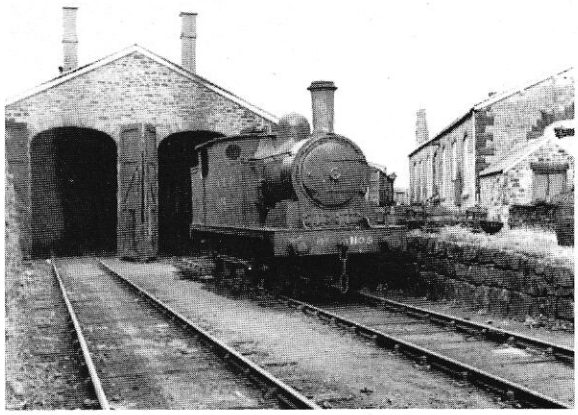
The Stanhope & Tyne Railway, conceived in 1831, was a magnificent project; the line was to begin at Crawleyside and climb over the fells to Waskerley then turn east towards Consett and the coalfields of Annfield and Beamish, before continuing over flat tracts of land to the mouth of the Tyne at South Shields. There was to be one major branch to Medomsley (east of Consett), and the total distance was 37¾ miles. Much of the inspiration for the line can be attributed to one William 'Westoe' Wallis, who in 1831 had secured the leases for collieries at Medomsley and Pontop; he also had a working relationship with the Rippon family of Stanhope who owned extensive limestone quarries. Another key figure was William Harrison, well known as a promoter of wagonways in the north of England and also a well respected engineer. Other members of the Harrison family were to become involved, including T.E. Harrison who was to become assistant to Robert Stephenson who was engaged as Engineer to the S&T.

The scope of the undertaking was immense and the promoters decided not to seek any Parliamentary powers for construction, thus hiding the magnitude of the scheme from the distant investors in London. As a consequence the line was built by 'way-leaves', that is to say by private agreement with the landowners, and this was to be a costly mistake. The fees were agreed by the company with landowners, the biggest of whom was the Dean and Chapter of Durham. Quite low rents were asked by the church for moorland, around £25 per mile per year, but as the line neared the coast they were asking £350. This landed the S&T with a huge annual rental that it could never really afford.

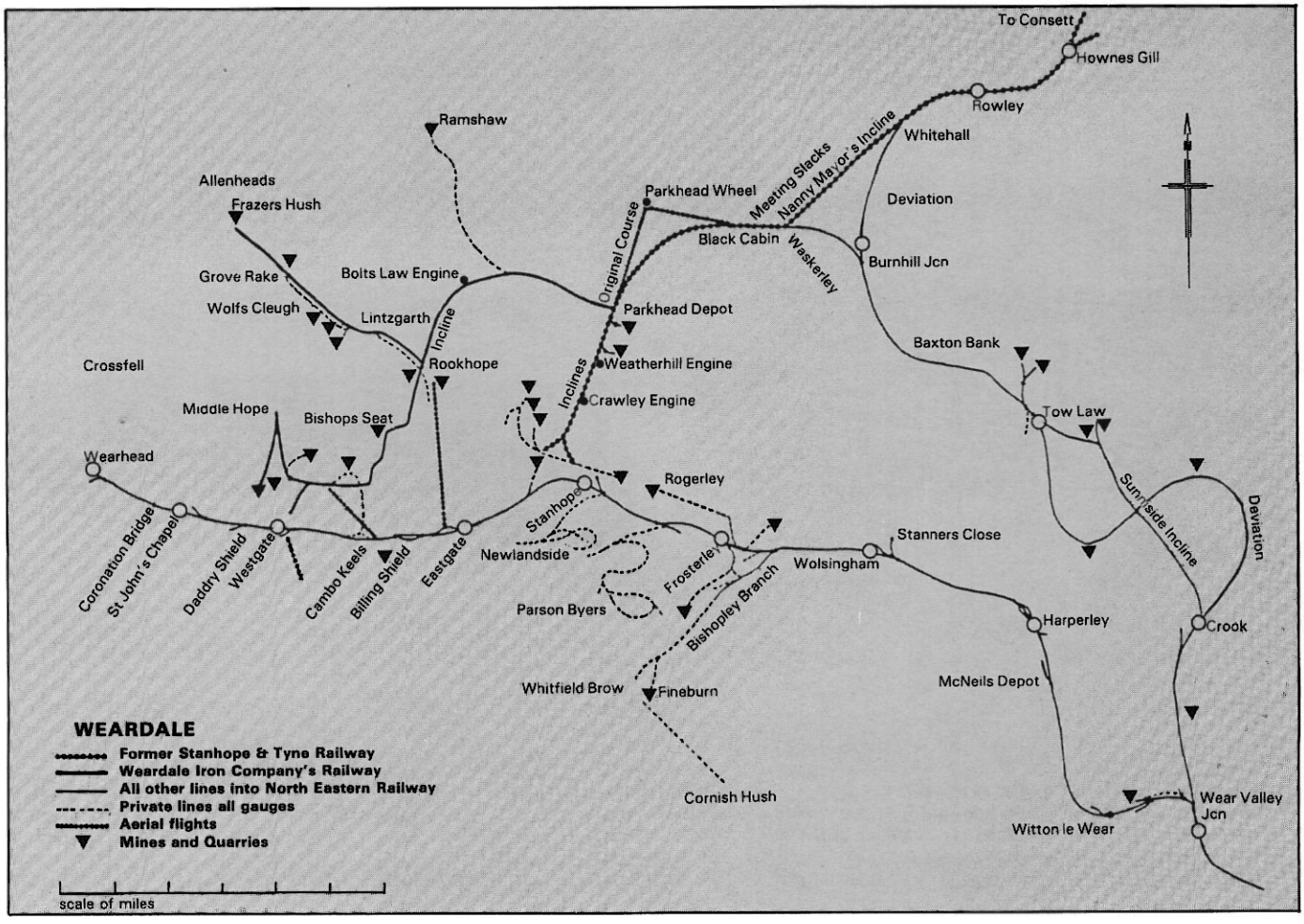
Work began under Stephenson in June 1832, and commenced at the Stanhope end of the line. Stephenson was ably assisted by young T.E. Harrison, and this must have been a great comfort, for at the same time Stephenson was consulting engineer on the London & Birmingham Railway. Despite the numerous inclines and wild desolate moorland the line was constructed with considerable speed. The western section from Stanhope to Carr House opened on 15th May 1834, with the whole line opening four months later on 10th September.

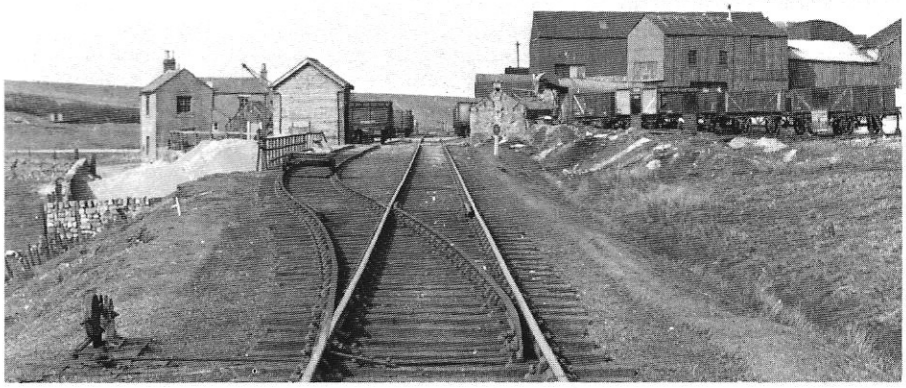
The line described

From an engineering standpoint the railway was then without equal, a major railway achievement. At Crawleyside the line initially commenced to the west side of the road (now the B6278) where the lime kilns, coal chutes and engine sheds were located. Around 1845-6 a further incline was built from Crawleyside down into Stanhopeburn Dene to serve the iron

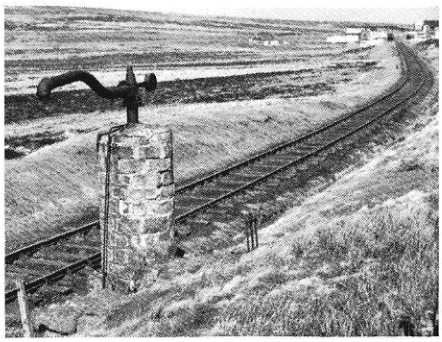


Ex-NER 0-6-2T 1105 at Waskerley c.1930. These 0-6-2Ts were very successful on train services across the Durham Fells. Waskerley shed was built in 1846 and continued in use on the bleak moorland plateau until 1940. The shed and warehouse were demolished 1953-4, leaving only the station master's house and weighbridge. Photo: J. W. Armstrong/NEOAM, Beamish





RIGHT: Parkhead Depot, a general view from the Weatherhill end on 21st April 1955 showing the sand crusher, quarry and loading arrangements. The growth of sand traffic from the Parkhead and Dursand quarries minimised the problems which would have affected the depot after closure of the Weatherhill & Rookhope Railway in 1923. Note that the empty wagons have their doors left open to avoid water accumulating. Photo: the late T. E. Roundthwaite



BELOW, LEFT: Remains of the water crane between Parkhead and Weatherhill in 1968. Erected in 1847 at a cost of £11 2s 6½d, it was wrapped in cork and bricked around to minimise frost damage. Photo: M. L. Ridley, courtesy Ken Hoole

BELOW, RIGHT: Hog Hill Tunnel, pre-1914. The interlaced tracks allowed 20th century wagons to pass through the 1833 tunnel. Barely visible is the builder date plaque erected by Stephenson and Harrison. Photo: Ken Hoole collection

furnace constructed by C. Rippon, though this was only open for 14 years. Later another terminal point was opened to the east of the road to serve the Ashes Quarry, which was operated by the Derwent Iron Company.

Crawleyside Incline was relatively short, just 934 yds, but at 1 in 8 it was one of the steepest in the country. The incline was unique in that it passed through an unlined tunnel hewn from the rock, on which the carved date 1833 is still clearly visible. The line was constructed on the three rail principle, though when the Ashes spur was opened the line was doubled, except for a very short section at the bottom. At the summit the engine was located in a pleasing stone building with a small squat chimney; inside, a Hawks & Co engine (of a George Stephenson design) was installed with a 2′4″ dia. cylinder and a 6′ stroke capable of producing 50hp.

Weatherhill Incline followed immediately on from Crawleyside, though at 1 mile 128 yards it was much longer, with gradients of 1 in 12 to 1 in 32. Again, the incline was on the three rail principle, and today stone sleeper blocks are still easily traced as are the 'way-leave stones' marking the boundary of the incline. Weatherhill Engine was located in a tall tower-like building constructed, like Crawley Engine House, from local sandstone. The engine was almost identical to the one at Crawleyside except that it only had a five foot stroke. This famous beam engine is still working today, and occupies a prime location in the National Railway Museum at York. Once the summit of Weatherhill was reached, horses were employed to haul rolling stock all the way up to the next incline at Meeting Slacks, though from 1844 until the deviation of Meeting Slacks Incline around 1847 there was a continuous rope system employed between the two engines. From Meeting Slacks the line descended to Waskerley, 1¼ miles distant, on gradients of between 1 in 41 and 1 in 47. Meeting Slacks Engine was of only 40hp, built by Hawthorns and with two unusual 'egg-shaped' boilers. Though it was kept in use after the later deviation, it seems to have become disused from about June 1859.

At the small hamlet of Waskerley the S&T centred its operations, and in later years quite a sizeable railway community was to grow up on this lonely moorland plateau. This growth coincided with the exhaustion of iron ore deposits at Carr House, after which time Cleveland ore off the Rosedale line was brought via the West Durham Railway to the WDJR. At this time an extensive network of sidings was laid in between Waskerley and Meeting Slacks, in order to cope with the reversal of traffic to and from Consett.

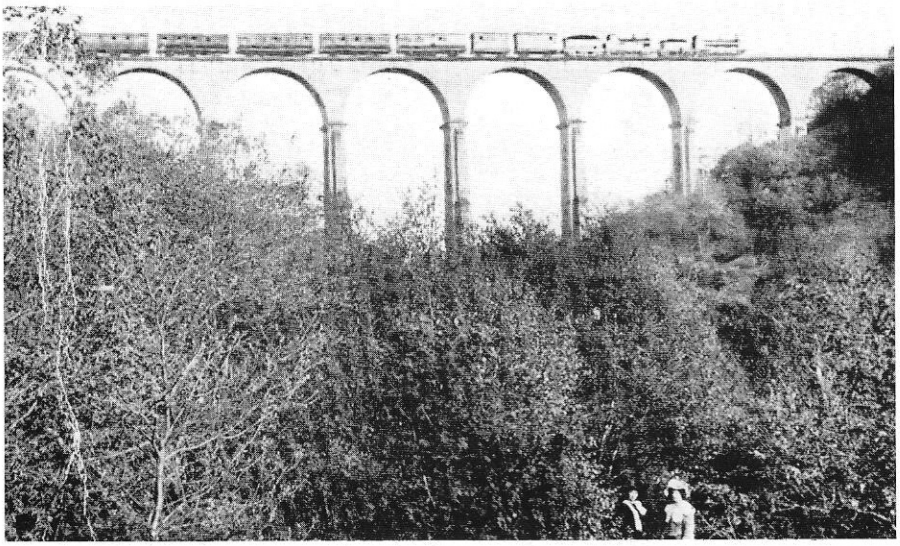
Beyond Waskerley was yet another incline, Nanny Mayers, named after an eccentric character who kept an ale house alongside the line. Nanny Mayers Incline was self-acting and 1,122 yards long, with gradients varying around 1 in 12. From the incline foot to the next obstacle at Hownes Gill it was 3¼ miles with the steepest gradient only 1 in 132, thus making it possible to use 'dandy carts'.

Hownes Gill was the final obstacle on the western half of the line, though on the eastern section (with which we are not concerned) there were further inclines at Carr House, Loud Bank, Stanley, Edenhill and Waldridge. For the engineers, the ravine at Hownes Gill must have been horrifying, and had the S&T's finances been healthier they would have undoubtedly constructed a viaduct. As it was they had to be content with what was little more than a cliff tramway, on which one wagon at a time was lowered on a cradle, turned at the bottom on a wooden turntable, then hauled up the other side in another cradle. Evidence of the severity of the ravine is given by the 1 in 3 gradient of the eastern rim. Not constructing a viaduct was probably the most foolish mistake made by Wallis, Stephenson and the Harrisons. Hownes Gill was to become a major bottleneck only capable of handling 120 wagons a day, thus limiting the system and causing a costly drain on resources.

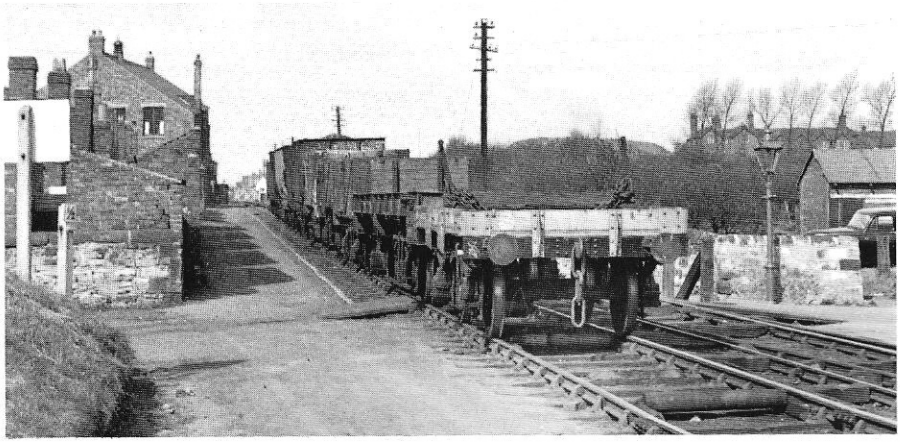
Operation

The inclines all had a different wagon capacity, Hownes Gill could handle just one at a time, Crawleyside two or three, Weatherhill managed four to six, and Meeting Slacks and Nanny Mayers eight each. This all made operating the line very difficult. On the western section the company employed horse power just as much as steam engines, and in the early years it could be said that it was little more than a glorified wagonway with locomotive haulage impractical on the inclines. In 1837 the company owned just seven locomotives, all painted slate grey and all named. Six were six-coupled engines, one four-coupled. This early fleet was sold off to meet creditors demands in January and February 1841.

The operating problems and high rentals had the company in serious trouble inside just a few years, and it continued to borrow money. As it was not incorporated by an Act of Parliament there was no limit on the amount it could borrow on the paid up capital of £150,000, in fact it almost doubled its borrowing to no less than £290,000 on which it was paying interest of 11% per annum. There was no way this could be maintained for any length of time and the creditors soon demanded settlement. At an extraordinary meeting of the S&T, held on 29th December 1840, it was decided that the company should be wound up. To salvage something, the investors formed a new company, the Pontop & South Shields Railway, formed to dissolve the debts and operate the eastern half of the line. The new company sought to incorporate itself by an Act of Parliament to obviate the costly way-leave fees, and this was obtained on 23rd May 1842. The affairs of the S&T were wound up on 5th February 1841.



Hownes Gill Viaduct c.1900 with a double-headed Darlington-Blackhill train. The severity of Hownes Gill is evident and it is easy to see why the inclines in and out were such obstacles until the viaduct was opened on 4th July 1858. Photo: NEOAM, Beamish



ABOVE: Waldridge Incline on the western section of the S&T in 1954 with Shildon-built wagons descending. The small capstans located on the respective legs of the turnouts enabled the hawsers to run smoothly over the points, snagging hawsers being the cause of frequent derailments.

BELOW: The same location in 1955 showing a common but rarely photographed practice on the colliery and mineral lines of the north. It was expected that the bankriders would use the side step and hand rail but it was common practice to ride on the left buffer stock; although there were no hand rails at that point many men judged it safer than hanging on the wagon side. The colliery sidings and buildings are visible on the left. Photos: the late T. E. Roundthwaite

Despite the sales of assets and rolling stock, the S&T was left with huge debts which the shareholders were obliged to meet from their personal resources. Robert Stephenson himself had become a shareholder in 1832, taking £500 in shares in lieu of payment for his professional services to the S&T. As a point of personal honour Stephenson sacrificed every pound he could in order to redeem his debts; including selling half his share in the engine works of Robert Stephenson & Co. For years after, the disasters of the S&T were to plague Stephenson financially.

New lines

The closure of the western half of the line was a disaster to the Derwent Iron Co who commenced production at the Consett steel works at the beginning of 1840 and were heavily dependant on the Stanhope lime for flux. Despite many attempts, they could not persuade the P&SSR to take on the operationally difficult western section. As a last resort the iron company bought the line themselves and commenced to operate it early in 1842, from when on the line was simply called the Derwent Railway. The company also had plans to stretch eastwards to Crook in order to join up with S&DR which was due to reach Crook early in 1843. Way-leaves were obtained between Waskerley and Crook during 1842, the projected line being called the Weardale Extension Railway. The S&DR were keen to participate in the venture but had to act with caution, as the line was again being built without Parliamentary sanction. Accordingly a group of intermediaries were employed, including J. Pease, J.C. Hopkins and T. Meynell all of whom were S&D shareholders. The iron company was persuaded to secure the way-leaves and provide £15,000 capital and the S&DR would then advance the money required for the construction of the 10¼ mile branch.

A contract was awarded to Messrs Harris & Bray at a cost of £24,000 and work began on 28th June 1844. Late in 1844, as the line neared completion, the three S&DR agents were joined by H. Pease and H. Stobbart and these five set about acquiring the leases and the way-leaves from the Derwent Iron Co, the transaction being concluded on New Year's Day 1845. The two lines now became known as the Weardale & Derwent Junction Railway, though again the title did not have any Parliamentary sanction. The transfer to S&DR ownership took place sometime between 1st January and 7th March, which was the date of the first meeting of the W&DJR sub-committee. From Waskerley the extension headed across a flat plateau descending towards Tow Law and Sunniside, where the elevation was around 1,000ft. There followed a steep descent down to Crook which was handled by a stationery engine, at Sunniside. The new incline was a tremendous feat of railway engineering, almost two miles long and, at 1 in 13, notoriously steep.

The new line to Waskerley opened on the 16th May 1845, and on 1st September a passenger service began operating between Crook and

Crawleyside, this connecting with another service from Hownes Gill, both portions being united at Waskerley. This service was terminated on 31st October, resuming again on 1st April; however, after withdrawal for the winter of 1846-7 the Waskerley-Stanhope service was never resumed.

Ownership by the S&DR

Now that the line had passed into the hands of the S&DR it began to show a small profit, but those inclines were still causing major problems, especially Hownes Gill. The long sections of horse haulage were also a major problem that had to be overcome, and the experiments that had been carried out by the Derwent Iron Co in 1844 with endless ropes had not provided the answer. The only obvious course was to replace some of the inclines with deviations or viaducts and the first to be so treated was the Meeting Slacks Incline which was deviated at a lower level in 1846-7.

As Waskerley now began to grow in importance as a railway centre, a locomotive depot and wagon repair shop was opened in 1845, though these proved too small and the depot had to be extensively enlarged only nine years later. On 8th April 1846 the engineer was authorised to invite tenders for a passenger station; three weeks later this order was rescinded and he was told to arrange for the erection of a similar building at Cold Rowley, on the western rim of Hownes Gill. The importance of this instruction can be best understood in the light of the proposed deviation of Nanny Mayers Incline and the eventual opening of the Burnhill 'cut-off' route. As early as 1843 the possibility of deviating the route along the contours of Whitehall Moss had been evident, though this would only be advantageous if the annoying bottleneck at Hownes Gill could be replaced by a viaduct (there being no possibility of a deviation there).

Hownes Gill was eventually bridged on 4th July 1858 when a 12 arch viaduct 150ft high and 731ft long was opened. It had taken 16 months to build and had been constructed from over 2½ million fire bricks made at the Pease's brick works at Crook. Following the viaduct's opening, the station at Cold Rowley was relocated at Rowley. The opening of the Burnhill-Whitehall deviation did not occur until 4th July 1859; trains could then run through from Tow Law to either Weatherhill or Consett, but trains from Weatherhill to Consett now had to make a reversal at Burnhill Junction.

The North Eastern Railway era

Only Sunniside with its 1 mile 1,568 yards incline remained as a major obstacle. In January 1857 W. Bouch was asked to prepare a report on its operations, costs and ways of improvement. Though several suggestions were made it was not until after the S&DR was amalgamated into the North Eastern Railway in July 1863 that the problem was resolved. However, Bouch had in 1858 proved it possible for one of his long boilered 0-6-0s to climb the incline hauling four chaldron wagons unassisted; these tests showed the engine capable of hauling a total train weight of 61 tons 16 cwt at a speed of approximately 18 mph, but liberal quantities of sand had to be applied to the rails. Despite the fact the newer designs of engines could handle the incline it was decided that a deviation would be built, and a circuitous new route, opened in 1867, took four miles from Crook to Tow Law and involved gradients around 1 in 51.

Meanwhile, the old incline was to be left in situ to serve the extensive industrial interests of the Pease family centred around Roddymoor and Sunniside, including coal mines, coking plants and the fire brick works.

Train services on the Weardale & Derwent Junction were largely mineral workings, but passenger services of a sort had begun on the first day of the S&T. Unfortunately, that day was marred when four open trucks holding 40 to 50 people broke free whilst travelling down the Weatherhill Incline. The brakeman at Crawley Engine was faced with the invidious decision of letting the runaways continue down the even steeper Crawley Incline, or to put them into the short sidings at the engine top. He chose the latter course, but unfortunately the sidings contained four loaded lime trucks and the runaways struck these with fatal results; three lost their lives whilst many more were seriously injured.

The two remaining inclines at Weatherhill and Crawleyside were considered with a view to improving them. In 1866-7 the NER replaced Crawley Engine and relaid the incline, and it is surprising that the hessian hauling ropes were not replaced with wire hawsers. Weatherhill was not, for some reason, replaced at this time. The disruption caused by the closure of Crawleyside halted traffic for several months and the lime for Consett had to be taken from the Bishopley Lime Kilns near Frosterley in Weardale; this involved a lengthy journey via Wear Valley Junction and Sunniside. Perhaps the cost of replacing the two engines at the same time was prohibitive or maybe the NER were trying to squeeze the last bit of life out of Weatherhill, but whatever the case it was to be a costly procrastination. By 1914 the engine had become worn out and was subject to frequent breakdowns. The delays to traffic that this caused were unacceptable at a time when the Derwent Iron Works were engaged in massive armament contracts.

In 1916 the company looked at the possibility of a deviation but decided against it. Plans were drawn up to replace Weatherhill Engine at a cost of £3,200 but it was not until 1919 that a new engine could be installed. By this time the cost had escalated to £4,046 5s 10d. The new engine was of a marine design and installed in a brand new red brick building on the opposite side of the tracks to the stone tower of the original winding house; it was a compound design with two lp cylinders and one hp cylinder, with steam raising provided by two ex-D17 class railway engine boilers. At the same time both inclines were finally rid of the hessian hauling ropes, replacements being 4,000 ton bs wire hawsers. In May 1938 the D17 boilers were condemned and replaced by ex-Hull & Barnsley engine (class J23) boilers, Nos.2542 and 2544. Around the same time the already lengthy sidings were extended and increased in number to accommodate the growing sand traffic from Weather Hill (*sic*) and Collier Law quarries.

Sand traffic grew considerably after the First World War, particularly at Parkhead (Blanchland), and this went some way to replacing the traffic joining the S&T at this point from the remarkable Rookhope Railway. The story of this private line is quite extensive, but some mention should be made herein as it became a major source of traffic on the S&T.

The Rookhope Railway

In 1846 the Weardale Iron Company was formed to exploit iron deposits in upper Weardale, specifically around Rookhope. Finance was provided by the Baring family who were also involved in the Rosedale Railway on the North Yorkshire Moors, where extensive iron ore deposits were likewise found. At first ores from Rookhope were smelted at the Stanhope Iron Furnaces near

Rowley station possibly c.1910 and certainly pre-1914, showing the unusual triple arched elevation. The glazed screens fronting the waiting room have not been incorporated in the preserved building. Note the oval telegraph plate hanging on the front of the early signal cabin. Photo: NEOAM, Beamish

Crawleyside, which had been constructed by C. Rippon in 1845. Although high grade iron was produced the furnaces were short lived and new furnaces were opened at Tow Law and at Tudhoe, where Weardale ore was mixed with ore from Rosedale.

Under the leadership of Charles Atwood the Weardale Iron Company prospered, leading to the growth of a small town at its iron works at Tow Law. Transportation of the ore from the Rookhope area had been both arduous and difficult, involving horse wagon transport to Stanhope. With the development of the Tow Law and Tudhoe works it became evident that Rookhope would have to be linked to the railway network. Atwood approached the S&DR early in 1846, with a view to them constructing a link. The S&DR were still heavily committed and declined the invitation, so following the example of their rivals, the Derwent Iron Co, the Weardale company decided to operate its own line. Work began late in 1846 but as the line was constructed by way-leaves little is recorded about its construction.

From a junction with the Stanhope & Tyne at Parkhead (Blanchland) the line traversed the bleak wastes of Stanhope Common, heading towards Bolt's Law some five miles distant. There were no major earthworks and the railway made long sweeping curves as it clung to the contours and avoided rocky outcrops. From the junction it climbed steadily to a summit of 1,670ft above sea level, and thus became the highest standard gauge line ever built in Britain. The line pierced the shoulder of Bolt's Law through a cutting at Redgate Head, where the company erected an engine shed, drum house, winding engine and cottages, all dominated by a tall square chimney visible for miles around. Between the junction and the works the line was single track, except for a loop at the point where a branch bore off to the north and descended down self-acting Dead Friars Incline to the lead mining community at Ramshaw. At the cutting the track split into three main lines with spurs branching off to the engine shed and boiler house. The incline down to Rookhope was just over 2,000yds long and approximately 1 in 12, though at the very top and at the bottom, as the line entered Rookhope, it was as steep as 1 in 6. With the exception of a short section of a passing loop in the middle, the track was single throughout. As it neared the bottom a branch forked off to the left to serve a number of coal drops, after which it crossed Bolt's Burn by a pitch pine trestle bridge. At this point there were several derailments over the years, and today the bed of the river is still revealing fragments of smashed railway trucks.

Rookhope was a major lead mining centre complete with an extensive smelt mill at Lintzgarth, and once the railway had reached the Rookhope Valley numerous developments took place. The line was extended up the valley to Grove Rake Mines in one direction, and in the other it curved round to Heights Quarry and the lead mines of Middlehope, located above the village of Westgate. Narrow gauge lines were constructed in the area by the Weardale Lead Company and thus an extensive railway system was formed in this remote upland valley.

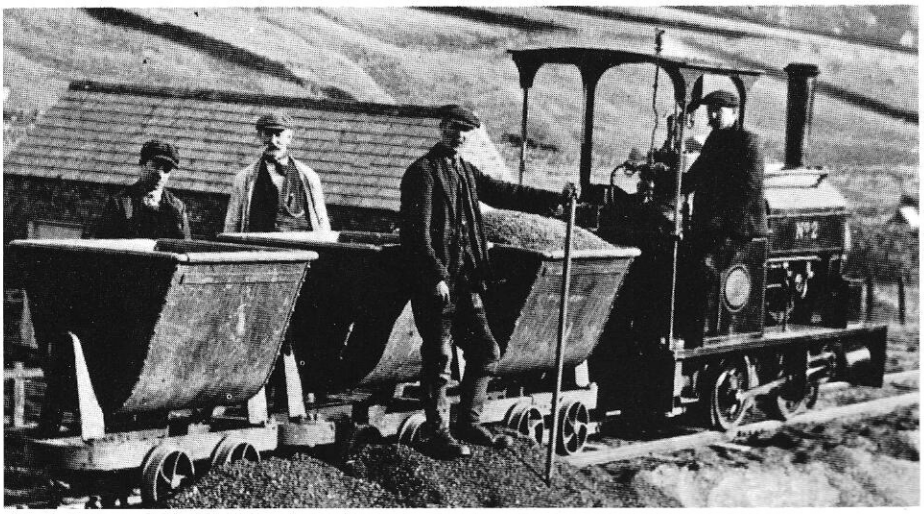
Locomotives employed were from a number of builders including Joicey, Black Hawthorn, Peckett, Robert Stephenson and Manning Wardle, making an interesting variety and an obvious nightmare for the engineers trying to maintain a supply of spare parts. The two narrow gauge engines of the Weardale Lead Co were built by Hawthorn, Leslie, No.1 being 2′ 6″ gauge and No.2 being 1′ 10″ gauge.

Decline of the Durham Fells railways

The lead and iron industry went into decline at the beginning of this century, but from 1907 onwards re-armament meant a demand for lead and thus the Rookhope line was reprieved. Throughout the First World War it continued to carry heavy traffic and from 1915 onwards German POWs were employed as labourers, specifically to build a new exit from the system at Heights, down an incline at Cambokeels to join the NERs Wearhead branch which had been extended up Weardale from Stanhope in 1895.

The end of the war signalled the beginning of the end for the Rookhope Railway, and it was confirmed by the closure of the lead smelter in the early 1920s. Between Rookhope and Parkhead the line closed on 15th May 1923, but from 1st June 1923 until the winter of 1936 a twice weekly horse-drawn truck ran from Bolt's Law to Parkhead to provision the inhabitants of the railway cottages.

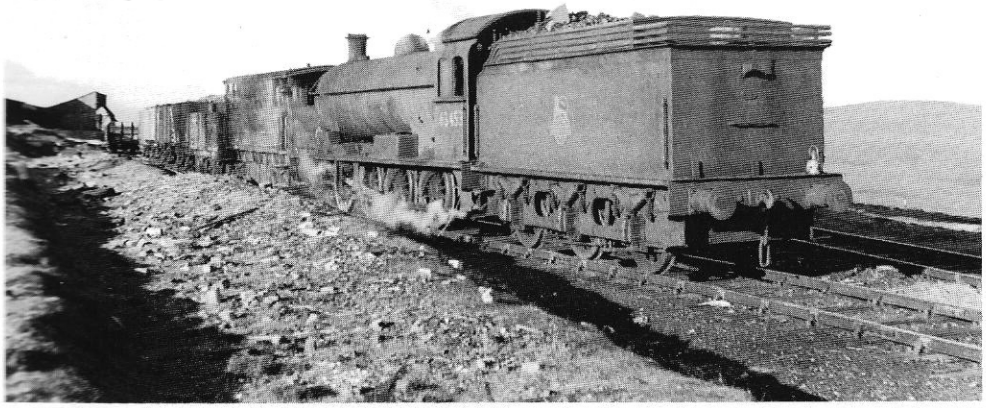
An odd feature of the line was a



ABOVE: Weardale Lead No.2, known affectionately as 'The Little Nut' at Rookhope. This 1′ 10″ gauge engine worked between Rookhope and Lintzgarth between 1913 and 1923 when the smelt mill closed. After withdrawal No.2 was carefully greased and stored in its shed for many years, but its fate is unknown. Photo: NEOAM, Beamish

RIGHT: The POW camp at Rose Hill, c.1917, with some of the German sailors brought to Eastgate station in a train of LNWR stock in 1915. Originally brought in to construct the Cambokeels/Cambo incline, these men subsequently worked all over the Weardale Iron Co. railway system as platelayers, bankriders and even firemen. Some stayed on after the war to work in the mines, marrying local girls. The chalk lettering on the barrack hut door reads "Charity Cottage". Photo: A. Earnshaw collection

Q6 0-8-0 63453 marshalling vehicles on the quarry siding at Weatherhill on 26th September 1957. The loading hopper is visible in the distance and to the left is the trackbed of one of the earlier lines removed 1950-51 when Weatherhill was adapted to its new role as the line's terminus.
Photo: courtesy Ken Hoole



little battery driven truck that was brought to the line in 1924 and which plied back and forth carrying tweed clad gentlemen in the grouse shooting season, a practice which lasted until the outbreak of war in 1939. All the track had been left in situ with the hope that one day the smelter might start up again, but in 1942-3 the track was lifted for war salvage and the line closed for good.

In May 1939 the Consett (Blackhill) to Darlington trains were withdrawn from the 'main' line, allowing the closure of the line from a point south of Burnhill Junction to a point two miles north of Tow Law. Then on 9th September 1940 the MPD at Waskerley was closed as a wartime contingency, the hamlet thus beginning a long period of slow decline as the railwaymen were transferred elsewhere. After the war had ended, the S&T was in sad decline, with the inclines at Weatherhill and Crawleyside handling minimal traffic, a situation compounded by the closure of Weather Hill Limestone Quarry, which itself had a narrow gauge system. On 20th April 1951 British Railways decided to close both inclines and expand siding facilities at Weatherhill where the line would then terminate. In 1953-4 the engine shed and warehouse at Waskerley were demolished, leaving only the station master's house and weighbridge. In 1963 the stone built winding house at Weatherhill was demolished as, after a century of exposure to northern weather, it had become dangerous.

Later traffic was mainly sand, limestone and fluorspar — a mineral largely discarded by the early lead miners but now easily accessible in the old spoil heaps and of value as a flux in steel making. Towards the end, traffic was handled mainly by class T2 0-8-0s, though class Q7 0-8-0s and class 04 2-8-0s were recorded on the line. Eight-coupled and six-coupled engines seem to have been ideally suited to it, though for many years class N8 and B 0-6-2Ts had worked the services. The principal engines in the early days had been the 1001 class; these were replaced by class J21, J26 and J27 0-6-0s which began working the line in the early 1920s. When Waskerley shed closed in September 1940, there were only a few engines left, including two class N10 0-8-0s which had come to the shed just a few months previously. Following the closure all the remaining turns were worked by Consett depot. In the mid-1960s a number of diesels appeared on the line, including several on evaluation tests from Darlington; amongst these, two Bo-Bos (now class 20) recorded double heading a sand train at Parkhead on 3rd March 1964.

The line lasted until the end of steam, but the final few months saw more and more diesels working the line. Normally, BR class 03 shunters were used, easily handling the trains now consisting of seven or eight wagons and a brake van as the daily service shrank to operating just a few times a week. Parkhead and Waskerley depots closed on 2nd August 1965, with Rowley station following in 1966; this station has since been carefully dismantled and re-assembled at Beamish, The North of England Open Air Museum.

Closure of the S&T finally came on 29th April 1968, from which time trains ran only as far as Burnhill Junction to serve Burnhill Munition Works but this section too closed the following year. Track between Waskerley and Weatherhill was lifted in the summer of 1969, when a British Thompson Houston/Clayton Bo-Bo (reputedly D8207) was seen on a demolition train. The remainder of the track was lifted during the first few months of 1970.

Today most of the track bed is open as part of a network of footpaths along old railway lines in County Durham, details of which are available in leaflet form from council offices and local shops. The 'Waskerley Way' forms a lengthy but exhilarating walk along the course of the S&T, and many railway relics can still be seen. It is best to attempt the walk in the height of summer; at any other time the weather can range between unpleasant and downright dangerous.

LOCOMOTIVES OF THE S&T (1834-1841)

NAME	*BUILDER*	*No.*	*WHEEL*
Thomas Newcomen	R. Stephenson	31	0-4-0
John Buddle	Stephenson & Co	50	0-4-2
Nathaniel Oggle	Stephenson & Co	63	0-4-2
James Watt	Stephenson & Co	66	0-4-2
Jacob Perkins	Tayleur & Co	14	0-4-2*
T. E. Harrison	R&W Hawthorn	?	0-4-2*
Robert Stephenson	Stephenson & Co	94	0-6-0
Robert Hawthorn	Stephenson & Co	?	?
Michael Longridge	Longridge & Co	?	0-6-0
Wm Hutchinson	Stephenson & Co	155	0-4-2
Geo Stephenson	Stephenson & Co	156	0-6-0
Projector	S&T Workshop	1(?)	0-6-0

**It is reported that these locomotives were converted to 0-6-0 in 1840*

WASKERLEY MOTIVE POWER DEPOT

Locomotive allocations

Circa 1900
During the later part of the 19th century the North Eastern stationed a large number of 1001 class 0-6-0 tender locomotives at Crawleyside. By withdrawal notices we know that 1004/7/11/27/44, 1191 and 1216 were withdrawn for scrap in 1908. There is a photograph of 1191 being coaled at Waskerley around the turn of the century. More members of the class were withdrawn at Waskerley in 1914, including 1079, 1272/81/90.

Circa 1910
In the mid 1900s a series of 398 class 0-6-0 tender engines began to replace the 1001 class locomotives. These newer engines had full cabs and were greatly preferred by the crews who had previously suffered half cabs on the earlier locomotives. The wilds of the Stanhope & Tyne demanded reasonable protection from the vagaries of the North Pennine weather. Engines based at Waskerley included 460, 788, 819/79, 923, 1379/83. Photographs taken on the line in this period also show 915 at Rowley and 406 at Waskerley shed.

Circa 1920
In the early 1920s nine engines were allocated to Waskerley, these comprised of:-
1-Class D22 4-4-0, 777 (known as the most accident prone engine on the NER)
1-Class J22 0-6-0, 498, which was withdrawn in December 1926
7-Class N8 0-6-2Ts, these included 74, 85, 136, 350 and 1105

Circa 1930
By the 1930s the J22 had gone, as had one of the N8s. The engines stationed there in the period included:-
1-Class D22 4-4-0, 777
1-Class D23 4-4-0, 678, though this was transferred to Kirkby Stephen for banking on the Stainmore line in July 1930
1-Class J21 0-6-0, 807
6-Class N8 0-6-2Ts, the numbers above, plus 1846

By the mid 1930s the picture had changed dramatically and the stock list now read:-
1-Class D22 0-6-0, 777, which was withdrawn early in 1935
1-Class J21 0-6-0, 807, transferred to Consett when the depot lost its passenger turn
2-Class J26 0-6-0s, 1366, 1676, both of which transferred to Gateshead MPD upon closure of Waskerley in 1939-40
1-Class J27 0-6-0, 1013, transferred to Sunderland June 1937
4-Class N8 0-6-2Ts, including 1105 and 1846

On the demise of 777 the LNER sent an ex-Great Northern 4-4-0, 4386, to Waskerley from York in May 1935 — after unsuccessful trials it was returned in disgust seven weeks later.

When the depot closed on 9th September 1940 there were just a handful of engines on the books, 1366, 1676 were despatched to Gateshead and 1013 to Darlington works. This left two N10s which had not long been allocated to the depot, 1148 and 1683, both were transferred to Consett on 9th September 1940. A Class J24, 1846, was also transferred on the same date, this time to Darlington.

There was always a breakdown train based at the depot, and this normally comprised of:-
1-8 ton Tool van, 97794
1-Covered match truck, 50705
1-8/10 ton NE hand crane, no. unknown
1-ex NE 'Bird Cage' brake van, no. unknown
The weather played an important role at Waskerley and there was always a snow plough based at the depot. The two best known were nos.5 and 14, both of which were converted from NER brake vans. □

STATIONMASTER

Noel Ford

The stationmaster's job is, in modern terms, a middle management, with considerable responsibility but limited authority. In the 1960s, the profession was decimated by line and station closures and this interview with a now retired WR stationmaster reveals what the job entailed in the years up the the Beeching axe.

Could you explain the promotional procedure to be appointed stationmaster?

The job is in the clerical grade. Many men worked their way up from porter to signalman, relief signalman and then stationmaster. In my own case, I began as a lad porter at Perranwell on the GWR Falmouth branch in 1941, but my railway career was interrupted by service in the Welsh Guards starting in 1943. Military discipline, both in respect of myself and of men serving under me, became very useful when, many years later, I was put in charge of a station. Railway management always appreciated this and it helped many promotions in the immediate post-war period.

In 1947 I rejoined the railway and became signalman Class 4 at Helston. I then transferred in the grade to Redruth station box, working Drump Lane and Redruth Junction boxes. Later on, still in Cornwall, I was relief signalman Class 2 and alternated on all the Truro boxes, Baldhu to Par Harbour and also back on the Falmouth line. I ended up as resident signalman at Truro East.

Was your ambition to progress to stationmaster?

Not specifically. But I wanted to get on, and I felt that opportunities were limited in Cornwall. London seemed the best place to be, so when the job of relief controller Class 4 at Paddington was advertised I applied, was short listed and appointed in 1956. However, I'd been there only four months when a Class 3 vacancy for stationmaster at Royal Oak was advertised in the London divisional vacancy list. The divisional manager at Paddington interviewed me and I got the job.

What was the situation at Royal Oak?

It was a suburban stopping station, with up and down platforms and no sidings. Access was from Westbourne Bridge. At that time — 1957 — Royal Oak was administered by BR Western Region but the stopping traffic was solely Hammersmith and City Metropolitan trains. WR trains ran through from Westbourne Park to the suburban platforms at Paddington, via Subway Junction.

I have to say that the post of stationmaster there was then not very popular. There were problems with staffing and discipline, but with my military experience I felt I could take the job on.

Did you [illegible]?

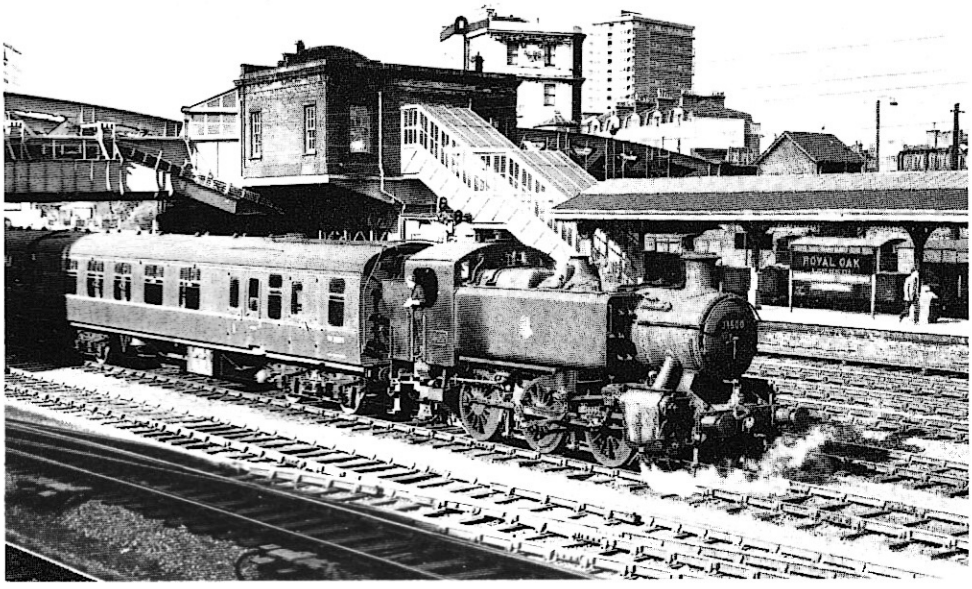
There was a changeover period during which I worked with the relief stationmaster who had filled in after the previous man had left. That was all. There were no examinations or the like.

What were your [illegible]?

To run the station, I had a staff of 11, plus myself. Three clerks, three porters, three signalmen and two ticket collectors. I was responsible for seeing that they were paid — the booking clerk actually paid out the money but I prepared the pay bill which, for convenience, also included Westbourne Bridge signalmen.

The station was open 5.00 am to 11.00 pm daily and the staff's shifts alternated each week. I was responsible for supervising the daily revenue and reporting to the treasurer's office at Paddington. I also ordered ticket supplies by requisition form sent to the supply office.

I ensured that the station was kept clean and tidy and that each staff



Hawksworth 0-6-0PT 31500 passes under Westbourne Bridge on 20th June 1959 with an up empty stock train. Royal Oak station ('Alight here for Westbourne Grove, Harrow Road and Porchester Hall') is in the background. The stationmaster's office was to the right of the top of the staircase platform access and the windows of the district inspector's office are visible above the leading coach. Paddington Goods is in the background. Photo: R. C. Riley

member performed his duties efficiently and correctly. I had to be able to answer passengers' queries.

Did you have responsibilities outside the station?

No, not at Royal Oak. Westbourne Bridge signal box came under the district inspector. But if anything went wrong that might affect other stations or departments — particularly with regard to the running of trains — I was required to notify the appropriate authority. This was particularly important at a busy station like Royal Oak; we had a train every eight minutes or so at that time. There were sometimes incidents about which I had to contact the BT police but most I could deal with myself. My uniform was my authority then, as in all my duties.

What about goods and parcel traffic?

There was none at Royal Oak. At most stations, though, both come under the stationmaster's responsibility. Royal Oak, as stationmasters' jobs go, was fairly basic.

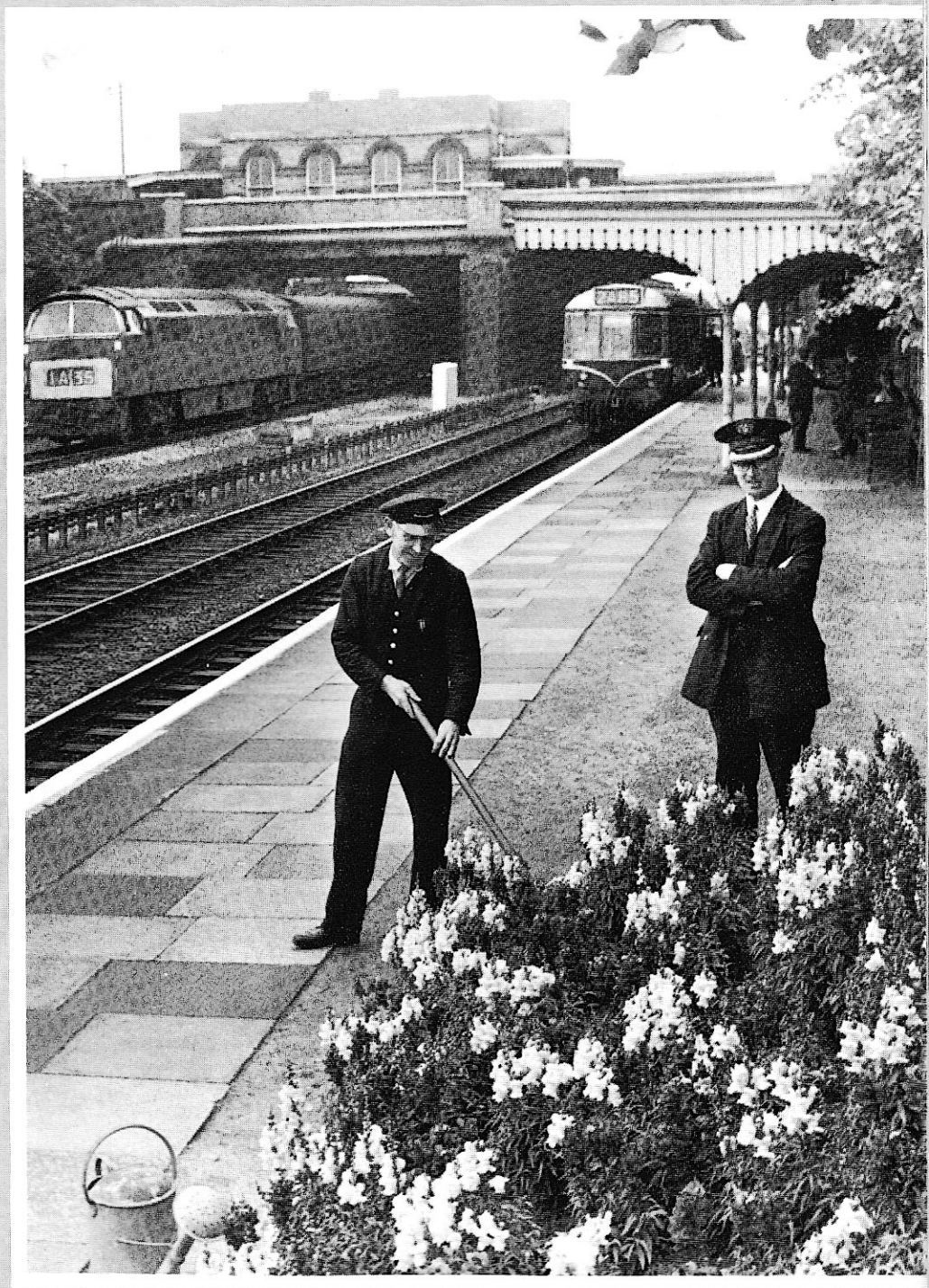
From 1960, you were stationmaster at West Ealing. How did this come about?

The vacancy was advertised in the WR regional salaried staff vacancies list. Salaried jobs were advertised regionally, wages vacancies were advertised divisionally. To me, the post at West Ealing meant promotion from Class 3 to Class 2.

How were stationmasters' posts classified?

Based on traffic at a particular station, its number of staff and the revenue it generated. West Ealing was a junction station for the Greenford line and the job included responsibility for two halts on that line — Castle Bar Park and Drayton Green — as well as for Hanwell & Elthorne, the next station west on the main line. From Paddington, some WR trains diverged at Old Oak, more at West Ealing and others at Reading. At West Ealing, most of Paddington's traffic, including all the West of England, Bristol, Cheltenham and South Wales trains, passed through on the down main. The stopping trains were local suburban, every half an hour or so.

West Ealing station in July 1963. A Western class diesel-hydraulic passes on the up main with the Red Dragon and a Greenford diesel car stands at the up relief platform. Stationmaster Ford inspects some of the station's 150 blooms tended by Porter Devereaux. Photo: Noel Ford collection



How did your new job compare with Royal Oak?

The staff were greater in number, for a start. I had four clerks, plus a chief clerk who supervised the booking office and looked after the pay bill. There were two station foremen who supervised the porters and dealt with parcels traffic and the milk trains. I had two ticket collectors, six porters and two shunters. I also had to keep an eye on the signal box which had six signalmen and two reliefs, but overall responsibility for it was the district inspector's.

West Ealing was terminus for milk trains from South Wales and the West of England and there was also a lot of brick traffic from Calvert. But because of a concentration of clerical work at the station I was not involved with goods traffic, this coming under Park Royal's jurisdiction.

What about the station layout?

Up and down main and up and down relief. The Greenford loop joined the main at the west end of the station with the goods yard adjacent. To the north of the running lines was the milk depot and the coal yard was to the south. Signalling underwent a big change during the 1950s — West Ealing being chosen to act as guinea pig for the new WR multiple aspect signalling. On the up side of the up relief was a small C&W repair depot which generated extra traffic.

You had three other stations, too.

Drayton Green Halt was unstaffed, but Castle Bar Park had two porteresses, one on duty at a time, working in two shifts. I visited the latter daily to inspect the station, collect the revenue and, on pay day, to pay staff. Both the Greenford line halts had double line platforms.

Hanwell & Elthorne, on the main, was rather different although it too had two platforms — one island serving the

TOP: Saturday 10th July 1957. Churchward 2-8-0 4700 has just passed West Ealing station on the down main with the 12.05 pm Paddington-Plymouth. The station offices were housed in the buildings straddling the running lines. Beyond the suburban train on the down relief is the milk depot and the siding to the coal yard diverges on the right. Note that new multiple aspect signalling has not entirely supplanted the semaphores. Photo: R. C. Riley

BOTTOM: Castle Bar Park Halt a week before Christmas in 1954. A family has just alighted from a Greenford-Ealing Broadway push-pull train propelled by 0-4-2T 1426. The circus poster adds a festive air. Photo: B. Y. Williams, R. C. Riley collection

up main and down relief and one single sided serving the up relief. The junction for the Greenford line was in advance of the up relief platform. Hanwell had two booking clerks and three porters, but signalling was controlled by West Ealing box. Transfer of staff between the stations was not uncommon.

Could you describe a typical working day?

I lived at Hanwell so usually called at that station first. I visited the booking office and checked that all was well. The porter's duties needed looking at — they included cleaning the toilets, sweeping platforms, entrance hall and stairs to the subway. I also made sure that every suburban train was attended by a porter.

Posters, which were put up by the London division bill poster, could become tatty and had to be inspected regularly. Lighting failures could affect passenger safety and had to be attended to promptly, as did the white line on the platform edges. Periodically, I checked on supplies of cleaning materials, stationery and tickets.

Once I was satisfied with things at Hanwell I caught a train or walked to West Ealing. If I walked I kept a constant eye open for anything wrong on the running lines — if you work on the railway this becomes second nature. At West Ealing I performed the same inspections as at Hanwell and then looked at the morning's post. There were internal circulars from Paddington regarding missing luggage, travel restrictions, the running of special trains and so on, plus a certain amount of general mail, but this rarely occupied me for more than half an hour.

Later, I would attend some trains and make sure all staff were doing their jobs. I also kept an eye on our gardens — we had a good reputation for these at West Ealing and won first prize in one of the annual WR competitions. Periodically, the painting gang under the chief civil engineer came round. Running repairs were notified to the engineer's office. Neither type of job was the responsibility of my staff — they all had plenty of work to occupy them. Generally speaking, the bigger the station, the fewer overlaps between jobs; whereas at smaller stations a porter might help out in the ticket office, this rarely happened at West Ealing.

What were you supplied with in the way of equipment?

A stationmaster's job is essentially supervisory and really only requires a uniform. I was issued with one jacket, one waistcoat, two pairs of trousers, one hat, one overcoat and one mac. They were all of good, lasting quality but I had to clean them myself. Oil burning hand lamps were provided at stations for emergencies or unusual tasks.

There was a great deal of responsibility involved.

For a man of 35, yes. About 40 staff, 8.30 to 5.30, six days a week. My military training was invaluable. I was allowed to get on with the job; my superiors recognised that I was in a responsible position and left me to enforce discipline as I saw fit. However, the assistant divisional manager (operating) could call at any time to check that correct procedures were being followed by my staff and myself.

For example, if a porter was required to attend a particular train, he had to be on the platform before the train arrived, call out the station name — there were no loudspeakers at West Ealing — and check on the safe and orderly entraining and detraining of passengers. His most important task, of course, was to make sure that all doors were subsequently closed and their handles turned before the train left. If a signalman saw a door handle not turned he immediately sent a 7-beat bell code on to the next box — 'stop and examine train'. The offending porter who had failed to check the door would be interviewed by myself and cautioned. Most disciplinary cases did not go beyond the station itself — I preferred it that way. Most stationmasters did.

You left West Ealing in 1963. Why?

Partly because of the closures under Beeching. They made both the job and the future very uncertain. The whole railway seemed to be in decline. Also, area managerships were coming up and I didn't fancy my chances. So I applied for a clerical job in the research section at Plymouth, assuming that I would be involved in planning for the future. Unfortunately, when I took up the post, I found out that my duties involved the organisation of station closures — not at all what I had envisaged or wanted — especially after my years as stationmaster. □

Working Goods Brake Vans

The second in a new series of edited extracts from the GREAT WESTERN RAILWAYS GENERAL APPENDIX TO THE RULE BOOK, produced for the instruction of the company's employees

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1. Booked "C" and "D" headlamp trains must, as far as possible, be worked by Vans branded with the letter "S" and every effort must be made to keep these vans in balanced working to ensure suitable vans working "Express" Freight trains. At certain Depots vans are set aside for specific working and are branded R.U. (Restricted User); these vans must not be allowed to work other than on the local services for which they are appointed.
2. Station Masters, Yard Masters and Yard Inspectors are responsible for revealing on the morning report to the Control or Divisional Officer accurate particulars of Brake Vans on hand, in accordance with instructions, to enable a satisfactory distribution to be made.
3. When it is necessary for Freight trains to be stabled short of destination, i.e. at an outlying Refuge Siding or Loop, arrangements must be made by Control Staff, or other responsible Officer, for the disposal of the brake vans, in order to avoid any unnecessary delays thereto.
4. *Doors of Goods Brake Vans must be kept locked on the G.W. System when not in use.*

Goods brake van doors are fitted with rim locks. Appointed Guards may, as a rule, retain possession of van door keys when resting but when on leave or absent from duty through illness or any other exceptional cause, the keys must be left at the depot or other appointed place. A number of spare keys for use by emergency men acting as Goods Guards are kept at the Depots and will be handed to these Guards as required, who must return them to the Depots from which they are obtained.
5. The Standard equipment of each van is as shown below:-

Set of side lamps
Tail lamp
Oil can
Shunting Pole
Sprags (not less than two)
Brake Stick
Short Drawbar and Block
*Hand Brush
*Fire shovel
*Bucket

*If any of these articles is missing this does not render the van useless for service.

These articles must be retained in the Van, and the set of Side Lamps and Tail Lamp — when not being used — must be placed inside the Van on the brackets provided. Special care must be taken to keep the Van door locked when the Van is not used for train working. *In no circumstances must the equipment* be taken from the Van except for replacement from Stores, neither must additional lamps be kept in the Brake Vans.

The locker provided with padlock (formerly used for A.R.P. equipment) must be used for the bucket, shovel, handbrush and oil can *and Guards must lock these articles up in this receptacle when not in use.*

6.Guards are responsible for the cleanliness and correct equipment of their vans. When leaving the Vans at the termination of trains they must place the side and tail lamps on the brackets inside the Van and see that the other equipment is placed inside and that the door is locked; they must report in the book provided for the purpose, particulars of any missing equipment or any matter requiring attention. They should keep their own property in the lockers provided in the Guards' room or cabins or deposit it with the Yard Inspector.
Note — In the event of a Guard being authorised to leave a train on a Goods line at a terminal point before the train is disposed of the person in charge must see that the side and tail lamps are deposited inside the van immediately the train is cleared from the Goods line and the door locked.
7. When Brake Vans are ordered to be sent from one Yard or Station to another, the equipment must be sent with them and they must be despatched without delay. Vans so sent must be labelled to the particular stations and particulars included on train advices.
8. Station Masters, Yard Masters and Yard Inspectors must arrange for the inspection of Goods Brake Vans weekly, and satisfy themselves as to their cleanliness and equipment, including the supply of suitable sand, reporting to the Divisional Superintendent any irregularity.
9. Guards must not paint over the bottom panes of the windows of Goods Brake Vans thereby obstructing the look-out, neither must the construction of the vans be tampered with in any way.
10. Guards must, when leaving a brake van, satisfy themselves that there is sufficient sand and oil for the next journey and must report to person in charge of yard any deficiency. Guards must, before starting, test sanding appliances to ensure satisfactory working.
11. Guards must show on journals particulars of vans working "light".
12. In the event of a brake van being marked off, or stopped for repairs, the Guard or the examiner (if marked off in the Yard) will be responsible for advising the Traffic Inspector, or person in charge, in writing of the fact. When vans have to be sent to C. & W. shops for repairs the vehicle must be locked up with all the equipment so that the van can be put into traffic immediately after repairs have been completed. The Yard Master or Station Master must also advise the Divisional Superintendent or District Traffic Manager the number of each van marked off, the shop sent to for repairs and the date.
13. When it is necessary to send Brake Vans to Shops for repairs the following instructions must apply:-

To Swindon Shops

The standard equipment must not be removed from the Vans before being sent to Swindon Shops, but must be locked inside the Van which must be labelled. Upon arrival at Swindon Works the equipment will be removed from the Vans and transferred to the General Stores. When the Vans have been repaired arrangements will be made to re-equip the Vans in the Swindon Shops from the General Stores.

To Shops other than Swindon

When vans are labelled to Shops other than Swindon, the equipment must be retained in the Vans, which must be locked.

The Chief Mechanical Engineer's Department will be responsible for ensuring that the Brake Stick, Wheel Sprags, Short Drawbar and Block are in the Vans before being put into traffic. □

Guard's eye view from the brake van of the 2.40 pm St Blazey-Fowey china clay train, 20th June 1956. Photo: Hugh Davies

YESTERDAY'S OBSERVER

JANUARY 1937

An evocative account of express running and more day to day detail of the British railway scene culled from the RCTS journal 'Railway Observer', this time from a half century ago

General

EXPRESS WORKINGS. During a recent visit to the Barnet district I was amazed to note what attention the "Silver Jubilee" is still attracting to itself.

Upon several occasions I was a passenger on the 5.15 pm train from Broad Street to Barnet. This train runs non-stop from Finsbury Park to New Barnet (or as nearly "express" as the shunting tank provided by the LMS can manage, the 1 in 200 gradient from Wood Green onwards invariably reducing the speed to a gentle canter). The first time I travelled by this train I was astounded to see the portly city gentleman in the corner opposite me carefully folding his newspaper, and commencing to stare intently out of his window; next I realised that all the newspapers in the compartment had been folded and that everybody was looking through the off-side windows — at nothing in particular. We had just left Oakleigh Park tunnel. Suddenly my city gentleman got up, dropped the window and, with complete disregard to the warnings of a paternal railway company, poked his head out as far as possible. This move frankly unnerved me, because I knew from experience that open windows are abhorred by GN suburban pasengers (perhaps this peculiarity results from daily journeys "down the drain" to Moorgate) and I began to think that my fellow passenger was contemplating suicide, especially as he was leaning out at a positively dangerous angle. So I decided that if he went out any further I would grab his ankles and haul him aboard. This drastic step, however, proved to be unnecessary, as the next moment he drew his head in and announced to the compartment in general "She's coming". The next moment the "Jubilee", in all her glory, raced by. We had a glimpse of the famous 2509, the unique string of coaches, and she was gone, saying "goodbye" to such mundane matters as suburbanites and LMS shunting tanks with a terrific blast on her chime whistle as she cleared New Barnet station. Then I realised what was responsible for my city gentleman's extraordinary conduct.

I was also surprised to see how many people returning from the city waited at New Barnet station to see the up "Scotsman" come flying down the bank. It is indeed a thrilling sight in the autumn dusk. First one hears, if the wind allows, a whistle as the train enters Hadley South tunnel; then, a few moments later, a faint plume of smoke and two flickering headlights as the train sweeps round the wide bend of Hadley curve; then comes a thundering roar, a brief flash of green and teak, the pink table-lights in the restaurant cars, and the "Scotsman" has passed, leaving us to dash to the other side of the footbridge to see her tail-light fading into the gloom while protecting signals wink from green to orange and red as she continues her dash for King's Cross.

Surely a sight worth waiting for, and one which, apparently, does not fail to stir the hearts of the most cold-blooded city magnates.

LMS

DETAIL ALTERATIONS. "Super Precursor" 5303 *Argus*, recently withdrawn, is believed to have been the last of its class to retain the original cab roof and Ramsbottom safety-valves. No.5022 is now fitted with separate dome and top feed. Royal Scot No.6127 was named *The Old Contemptible* at Euston on Saturday, November 28th.

A number of ex-LNW engines whose names were duplicated by those appearing on "Jubilees", had their plates removed in September. Among them were 5311 *Express*, 5358 *Malta*, 5359 *Cyprus*, 25671 *Arethusa*, 5999 *Vindictive*. Presumably 25310 *Thunderer*, 25350 *India*, 25356 *Gibraltar* have been running "blank" since about the same time. 5290 *Achilles* was never seen running without nameplates.

LOCOMOTIVE AND TRAIN WORKINGS. The "Turbomotive" No.6202 has several times recently worked the down Merseyside Express, and it has been particularly interesting to witness a start from Mossley Hill with a load of 16 or 17 bogies. In the first place, a continuous roar is heard, becoming louder as the train accelerates (which it does very rapidly) and then a high pitched whistling as speed increases. Owing to the more uniform power transmission this engine has never slipped once in starting, though Royal Scots and Pacifics rarely get away without some trouble.

LNER

STRATFORD. On a visit to Stratford on 19th December 1936 no less than twelve M&GN locos were seen in the yard in various stages of dismantling. They were Nos.14, 18, 23, 26, 027, 37, 39, 45, 62, 67, 068 and 079, whilst it is understood that Nos.96 and 99 are at present going through the shops. It will be noticed that three of the locos mentioned had since October been painted in LNER style at Melton Constable. Two of the locos had LNER pattern shedplates in the cab, namely No.37 MELTON CON (*sic*) and No.62 SOUTH LYNN. Evidently the "B" class 4-4-0s are not to be scrapped yet, as the LNE crane locos and 7281 have been removed from their shed to make room for the 4-4-0s. The following GE locos were stored at Stratford: J15 7877, 7920; J65 7155, 7249; J67 7015, 7203/4, 7263, 7331, whilst J66 7298, 7301/7/9/10/24 were standing together minus coupling rods marked in chalk "To Millwall Junc". Nos.7307/9 had been observed a few days earlier running light up the Cambridge line from March. A stranger at Stratford was Y1 No.8400, bearing a label addressed from the Lowestoft P.W. Dept to Chief Mechanical Engineer, Loco Works, Stratford; the label was headed "By passenger train. Not to be used for packages over 1 cwt in weight". Sentinels are indeed light shunting engines!

GWR

SWINDON WORKS, 1936. During the year a record number of 149 new locomotives, 393 new observation window type carriages, and 4,260 new wagons were built at the Swindon Works. In addition 2,100 locomotives passed through the shops for repairs, and 154 were condemned. Fifty restaurant cars were completely reconstructed and fitted with up to date equipment, and the Company's fleet of streamlined rail cars increased by 11 to 18. The 1937 programme includes the construction of 286 locomotives, 500 passenger train vehicles, and 3,940 wagons. The total passenger and freight mileage run during 1936 amounted to 97,400,000. The freight trains alone ran 1,500,000 more miles than in 1935.

PARLIAMENTARY PROPOSALS. In a bill introduced before the 1936/7 session of Parliament, the GWR seeks powers for a considerable development programme, estimated to cost £726,500. In the London area further addition to suburban traffic facilities is indicated by the proposed three mile extension of the North Acton-Ruislip line authorised by Parliament last year. The further projection now proposed will carry the line out to Denham.

In the west country some considerable works are proposed. The company obtained powers by its Acts of last year for an inland deviation of the main line between Newton Abbot and Dawlish Warren. The current Bill proposes a northward continuation of this deviation so as to rejoin the existing line near Exminster, the construction of the redundant portion of deviation to be abandoned. Seven and a half miles of new line, involving heavy engineering works, are entailed. At Pyle, in South Wales, a westerly junction curve is proposed between the main line and the Porthcawl Branch, entailing three-quarters of a mile of line. A number of smaller works at various points on the system is included, also the abandonment of the Hallatrow-Limpley Stoke line between Hallatrow and Camerton, and of a number of short lengths in South Wales.

SR

MELDON QUARRY TRAIN. This train runs four and sometimes five times weekly from Meldon Quarries near Okehampton to any point where extensive re-ballasting is to take place. The train is usually composed of ten 40-ton hopper wagons laden with ballast, and the special brake van, making a total weight of nearly 500 tons. About 9.00 pm the train leaves Exeter (St David's) to climb the half-mile stretch at 1 in 37 to Exeter Central, the train engine being an "N" class 2-6-0, piloted by a "G6" 0-6-0 tank, and banked up by two more "G6" 0-6-0 tanks. Four engines on an eleven wagon train must be nearly a record.

PARLIAMENTARY PROPOSALS. In a miscellaneous Bill the Southern includes a three-quarter mile branch of the Swanley-Sevenoaks line at Eynsford, to diverge on the west side, the point of junction being at the south end of Swanley tunnel. Land purchase powers on the Staines-Wokingham, Guildford-Reading, Dorking-Horsham, and Tunbridge Wells-Hastings lines, and the substitution of a series of level crossings by bridges, appear to be incidental to electrification schemes. The estimate for works included in the Bill is £156,925. □

The Gresley Beat

LEFT: 2743 *Felstead* **leaves the south portal of Stoke Tunnel in 1932. Then only four years old, this engine was the first of the Gresley A1/A3 Pacifics to be constructed to A3 specification from new.**

RIGHT: Kings Cross MPD is the location in September 1934 for 2746 *Fairway*, **also from the 1928 batch of A3s. The following year, the golden age of the A1/A3, which had lasted from the mid-1920s, was abruptly brought to a close by a single event — the introduction into service of** *Silver Link*, **pioneer of the even more glamorous, and record-breaking, A4s.**

BELOW: *Minoru* **near Doncaster with an up express in 1932. Outshopped in May 1925 as Class A1 2561, it was rebuilt to A3 standard in June 1944.**
All photos: private collection

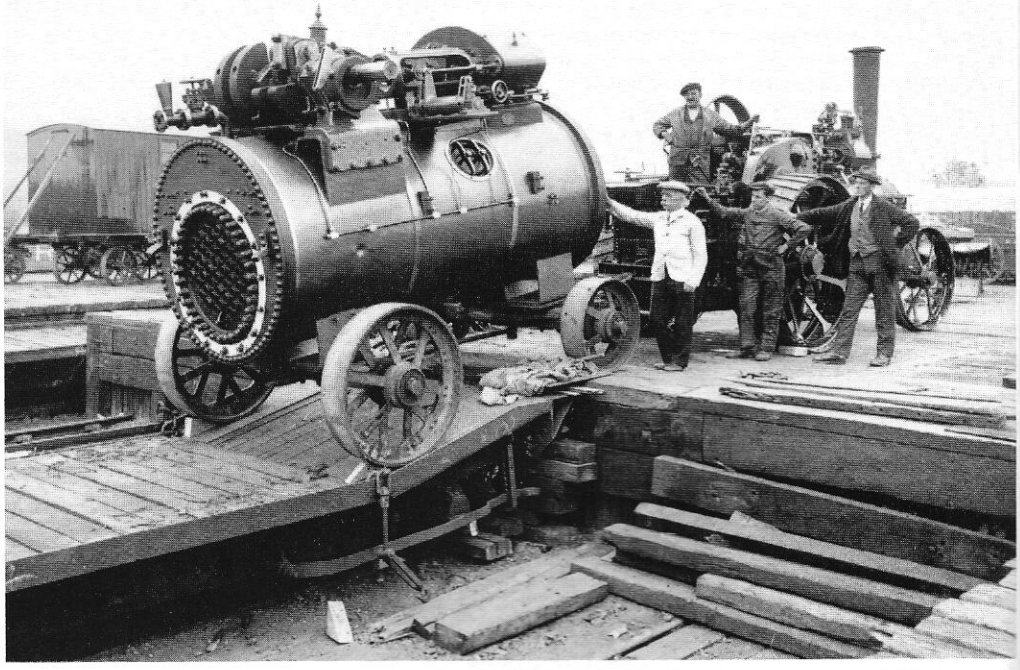
Freight Handling

Derby St Mary's goods depot on 29th March 1911 showing the interior of the transhipment shed and demonstrating the wide variety of traffic handled in an era when virtually all goods were sent by rail. The work was labour intensive, with all items manhandled using barrows and hand cranes; there were no mechanical aids.

Transhipment sheds were used to make up full wagon loads of traffic from and to stations which would not justify a through wagon, e.g. Manchester might load a transhipment van for Derby with traffic for Lincoln, Newark, Mansfield, Loughborough, etc, which would be unloaded at Derby and transferred to the appropriate van for onward transmission.

Note the destinations painted on the roof girders and the gas lighting – very necessary with crates and straw lying around.

Prior to acquiring its permanent home at Stoneleigh near Kenilworth, the Royal Show was held at a different venue each year. In June 1921 it was Derby's turn and this photograph shows a portable engine being unloaded at the special sidings at Osmaston Park where the show was held. These sidings were within the Carriage Works and all cartage was dealt with by the MR except for engines, etc, which could be moved by their own power.



Behind the scenes on LMS constituents; humble goods traffic, rarely photographed

Until well after World War II, London consumed vast quantities of coal, much of which was conveyed by rail to depots scattered around the capital. This March 1905 view shows Cambridge Street coal depot near St Pancras. Each coal merchant had his own store and office at road level and the rail wagons were discharged through a bottom door into the merchant's store where it was bagged for sale. London was unique in using 2cwt sacks and also the curious bow fronted carts, one of which can be seen on the left-hand side of the road.

St Pancras station on 9th January 1912 with a horse drawn train of platform barrows; those at rear are normal flat versions for parcels but the leading vehicle is a mystery. St Pancras may have been the only passenger station to use horses; at the majority, barrows were manhandled until the introduction between the wars of petrol tractors.

When farms were moved over long distances, rail was the obvious choice as everything could be loaded onto one train. This photograph shows one such removal, from Great Harwood in Lancashire to Wye in Kent on 19th October 1932. The sheep are being loaded into a cattle wagon; the others are possibly for cows. Also visible are a horse box and at the rear a container probably for the farmer's furniture.

Photographs from the collection of **THE NATIONAL RAILWAY MUSEUM**
Captions by **T. J. Edgington**

LETTERS

AN ENGINEMAN'S DIARY

Professor Simmons' most interesting article (Summer 1988) includes a brief item for 4th March 1859, concerning the death of an engine driver at Stafford and points out in the accompanying footnote (5) that the relevant accident report was not published. I hope the following contemporary paragraph from the Staffordshire Advertiser will be of general interest in view of the particular circumstances surrounding this fatality:

"HORRIBLE DEATH AT THE RAILWAY STATION

Early on Saturday morning last, a fearful accident occurred at the railway station in this town, by which an engine driver was almost instantly deprived of life. It appears from information derived at the time, and also from the evidence given at the inquest, which was held on Monday last before Mr W.W. Ward, that the deceased, George Scott, of Preston, was an engine driver, the duties of which he had discharged for seven years.

On the evening of Friday, accompanied by Mr Thomas Barron, his stoker, he brought a mineral train from Preston for Bushbury and Bescot. On arriving at Stafford, about half past twelve o'clock at night, he got off the engine to enquire of the inspector on duty whether he should proceed with his train before or after the mail. Finding that the mail train was to leave first, Barron shunted the mineral train to the Shropshire Union line, and after the former had passed and gone forwards, Barron brought the train to the station, when the deceased attempted to get on his engine, but in doing so he missed his footing and fell under the wheels of the tender and the three following carriages, which passed over his body. There were two engines to the train, which consisted of forty carriages, and it was almost immediately stopped; but on the body of the unfortunate man being got out from between the rails and placed on the platform, it was found that both legs were frightfully mangled and from the abdomen, which had been cut open slantingly, the bowels protruded. The poor fellow gasped three times after he was removed to the platform, but gave no other indication of life.

It transpired at the inquest that the deceased was acting contrary to instructions in getting off his engine, but there was no evidence to show that he was in any way inebriated at the time of the sad occurrence. He was unmarried. The jury returned a verdict of 'accidental death' and the body was subsequently conveyed to Preston for interment."

Two minor points from the above verbatim report: Baron's name is spelt with two Rs and Scott's funeral is stated to take place at Preston, not Bolton. Note also that the train was double-headed although the second crew appear not to have taken part in the present proceedings. It is intriguing to read from the diary that Baron "worked the train back" — was he travelling light? Or was this after the train had been off-loaded at Bushbury and Bescot? In any event, despite Baron's unquestioned competence, one must assume that a replacement driver was obtained at Stafford. In fact, a relief engine had been stationed at Stafford for more than twenty years, following a derailment south of Whitmore less than two months after the opening of the line (1837). On that occasion, a "reserve engine" at Birmingham (*Stentor*) which was sent to the scene, itself broke down and traffic was delayed for up to *ten hours*; many of the stranded passengers hired "chaises-and-four" and other conveyances, intending "to recover their expenses from the Railway Company". Accordingly, the engine *Caliban* was posted to Stafford before the end of that year and the practice was continued.

Whatever his shortcomings, the unfortunate Scott was exonerated from any suggestion of drunkenness on duty. This was not always the case! For example, on Christmas night 1847 the pointsman at Newton Junction became increasingly alarmed at the excessive speed of the approaching Liverpool-London mail train — regardless of a mandatory 5 mph limit on the severe curve. "Anticipating great danger if he should turn the points", he allowed the train to continue straight ahead towards Manchester. The rear guard tried to attract the attention of the engine crew, but without effect, and "finding this to be the case he — at very considerable risk — passed over from carriage to carriage till he reached the engine, where he found both driver and fireman lying drunk!" The guard managed to stop the runaway train just short of Patricroft station (14 miles from Newton) — where a violent collision with a standing passenger train was narrowly averted. The drunken crew were each sentenced to two months hard labour.

C. R. Lester, Stafford

I send this footnote to Professor Simmons' interesting paper on Thomas Baron's diary.

In volume 66 of the Railway Magazine (1930), p.320, there is a paragraph dealing with the practice of engine driving by contract, a system used on some lines during part, at least, of Baron's days as an engineman. The examples cited in RM are of the Stockton and Darlington in 1830, when drivers were paid ¼d per ton-mile, out of which they had to find coal (or coke) and lubricating oil, and possibly pay their fireman as well. Two more detailed cases are given from the Eastern Counties Railway during 1854 and "a few years later" (exactly how many is unspecified). A driver stationed at Peterborough is recorded as having his price for working goods trains increased from 5¼d to 5½d per mile.

"A few years later" the price for working passenger trains between London, Enfield and Hertford was 3⅞d per train-mile, out of which the driver had to find firewood for lighting-up, coal or coke, tallow, etc, and to pay for minor repairs to his locomotive. He also had to assist with running repairs on shed days. He was not obliged to pay for spares made of iron, brass, copper or steel, but presumably for other items. Fuel and stores required had to be purchased from the company — a neat little scheme! The company charged him 3d per mile if he required an assisting engine on any trip, but paid him only 2d per mile if he was sent to assist another driver — a handsome 33⅓% profit for the company! The agreement between the company and the driver was written in proper legal form, signed and witnessed.

It would be interesting to know if this system was also practised on the LNWR. If it was, this might account for Driver Baron's meticulous recording of mileage and load details, and also for the discontinuance of his diary, if the practice of contract-driving was terminated at the end of 1862, as it might well have been.

Peter Erwood, Fleet Hargate, Lincs

BACKTRACK READER SURVEY

Your survey has confirmed what I have long felt. I consider that you have done the enthusiast a great service, not only by carrying it out but also by publishing the results in as challenging a way as possible. It is good to read a review so lacking in complacency. I can only hope that your comments cause enthusiasts to set down their feelings and perhaps create dialogue between publishers and those who buy their products.

Roger Golder, Malton

I fear Nigel Trevena is guilty of rewriting history to support his cause in BACKTRACK, summer 1988, when he claims of the LNER, and I quote, "its impecunious nature ... rendered it quite unfit to impose standardisation on its ramshackle empire." It's an historical fact that the constituents of the LNER were grouped together by design and after considerable deliberation, specifically to avoid the highly centralised structure favoured by the LMSR. Further, standardisation of the locomotive fleet was imposed on the LMSR because the ramshackle policies in the company's locomotive design and construction demanded a change. There is no evidence to support the clear implication that standardisation on the GWR/LMSR model was ever contemplated on the LNER. Given the development and longevity of the most numerous locomotive classes brought into the LNER fold at Grouping one might, I suggest, reasonably suppose this proved to be the correct policy for the LNER.

When writing of the Southern Railway, and again I quote, "Its railways had charm, at times, but no grandeur" is the author considering the same organisation responsible for, say, Waterloo station, the largest in the land, Southampton Docks, Clapham Junction, the famous Golden Arrow and the Atlantic Coast Express?

Attention should also be drawn to the claim in one of the book reviews that, "Manchester was once the only British city, apart from the capital, to boast four termini." Glasgow appears to have suffered a grievous injustice here.

Finally, when Lewis Reade opines in his Deltic piece, "the colour blue ... is cold and uninviting, not entirely appropriate for a transport system dependent on the goodwill of its users", he may care to ponder on the highly successful application of "the colour blue" on a number of counts. For example, the liveries of the Great Eastern Railway, Caledonian Railway, the Somerset & Dorset, Great Northern Railway (Ireland), LMSR and LNER streamliners, the Baltimore & Ohio Railroad's 'Royal Blue' train, British Railway's blue Pullman, West Coast main line electric locomotives, Glasgow electrics and some would even mount a plea for the original English Electric Deltic.

David Jackson, Scunthorpe

I read with some interest the results of the recent survey into the popularity of the different railway companies, published in your journal. None of the results came as any surprise. For a period of ten years from 1959 I was a regular subscriber to two railway magazines. At about the end of steam on British Railways both magazines appeared to suffer a crisis of confidence and their editorial policies veered in so many different and sometimes contradictory directions they became caricatures of themselves. I suffered a similar crisis myself in that I could not find anything of real interest in the gradual disintegration of our railways and it was not until the mid-seventies my interest in railways resurfaced. It came as a surprise to discover all the previously well balanced publications of the sixties had become GWR house journals.

I no longer subscribe to railway magazines and have become what could be termed a 'flipper'. Every month I visit my local newsagent and flip through the various railway publications. Very occasionally I shall buy. What I have discovered is a pro-GWR bias which amounts very nearly to a conspiracy. I have now reached a point where if a magazine has a photograph of a GWR engine

continued p142

STAMFORD TOWN

The station building, today Listed Grade II, is seen here on 31st May 1958. The architect was Sancton Wood and its grey limestone construction, completed in June 1848, harmonised perfectly with the town. The former MR line from Leicester to Peterborough opened in October 1846, Stamford initially being served by a temporary station at the east end of the tunnel. The GNR also served the town with a branch from Essendine to its terminus latterly known as Stamford East; opened in 1856 its passenger service was transferred to Stamford Town in March 1957 until withdrawal in June 1959. The driving trailer coach of the Seaton pull and push train is at right.

GWR 6028

King George VI **takes water at Old Oak Common shed, 5th May 1956. When built in July 1930 it was named** *King Henry II*, **gaining its later name after the abdication of King Edward VIII. Following the successful fitting of a double chimney to 6015 in September 1955 all the Kings were so modified but 6028 remained in single chimney form until June 1957. It was withdrawn in November 1962, only four of the class outliving it, all being condemned the following month, although 6018 survived to work a special on 28th July 1963.**
Photos: R. C. Riley

on its cover I don't even look inside. I suppose this could be called a persecution complex. It is no such thing. I have no need for biased magazines.

I am a member of three railway associations, I have enough common-sense to use public libraries not for current magazines but for past issues. By this method I have been able to order back numbers of magazines from the specialist trade.

David Hamilton, Port Glasgow

I regret that your survey provides no basis for marketing decisions given its failure to apply correct sampling procedures, the apparent ambiguity in questionnaire design and the assumptions in the analysis. I question whether it validly assesses the interests of your subscribers and most certainly should not be extrapolated to a wider group of enthusiasts. Congratulations on the attempt but don't take the results too seriously.

P. McQuin, Australia

CROXLEY GREEN AND RICKMANSWORTH

I enjoyed your item on the LNWR lines to the above (Summer issue). One sentence, although not incorrect, might be misread by someone unfamiliar with the line: "Initially, all trains were steam hauled but electric operation commenced on the Euston-Watford line on 16th April 1917" — quite true, but some may be lead to think that electric trains were running Euston-Watford from this date. This is not so; Oerlikon electric trains did not run the full length of the line until 10th July 1922. Until then the Euston-Watford local service was still steam-hauled.

The LNWR operated its own power station at Stonebridge Park. From February 1916, using this power, Oerlikon stock ran from Broad Street to Watford using Kensal Green Junction to drop down from the Broad Street-Willesden line to the new line and so on to Watford. Using the new power station the Broad Street-Richmond line opened in October 1916. The Broad Street-Watford trains only ran at peak hours; the main electric service to Watford was the LER/Bakerloo line, extended from Queens Park to Willesden in 1915 then on to Watford from 1917. These underground trains at this time ran in LNWR colours.

Work resumed on Camden Town Junction in 1919 and was completed in 1922, so enabling electrics to run out of Euston to Watford on the new line, a regular service from Broad Street to Watford also using this route.

The first class section of the Oerlikon stock was the most luxurious I have ever seen apart from the old royal trains.

R. A. Taylor, Watford

SOLWAY JUNCTION RAILWAY

A. J. Mullay's interesting article on the Solway Viaduct (Summer '88) did not mention that the SJR, like many others of its time, was built in the hope that traffic would eventually justify double-tracking. Most land formations were built to the requisite dimensions, and I recall from a walk on the southern end of the viaduct shortly before demolition that the first two hundred feet or so were also to double track width before narrowing for the rest of the crossing. Observation of the picture on page 77 will bear this out; the spans are supported on five piers, but provision for a sixth is clearly evident on the left hand side. Confirmation is also provided by the picture on page 78; of the piers protruding from the eroded end of the embankment, the sixth pier is just out of view on the left.

My father travelled frequently over the viaduct in the early years of this century, and had a very clear memory of one journey to Annan in a glass-ended observation carriage which was coupled to the locomotive. This was four-coupled with inclined outside cylinders, and he had a good view of it as it was running tender first. The weather was stormy, which made for an exciting crossing and probably also a very wet one for the engine crew. Presumably the engine was an elderly survivor of Benjamin Connor's 2-4-0s, but perhaps someone more learned than myself could be specific on this point?

Bearing in mind the rough weather and salty atmosphere, it is rather surprising that the bridge lasted as long as it did. At the time of my walk it was in an obviously poor condition, many of the decking panels being completely rusted through so that the sea was visible beneath; a thirsty Scot who had just walked over from Annan assured us that he felt the structure trembling under him on sections where the tide was running strongly!

Finally, as a point of interest, although the viaduct itself was demolished in the early thirties the track from Bowness to Kirkbride and also from Abbey Jct to Brayton was not lifted until several years later. The scrap from the viaduct was reputedly sold to Japan, whence it was no doubt returned in kind (and with interest) nearly ten years later.

H. M. Liddell, Fairford

I thought your readers might be interested in some additional facts about the fascinating railways around the Solway Firth. Train services began in September 1869, but due to the boggy nature of the ground on the English shore the BoT refused permission for passenger trains to commence "until such times as the embankments do consolidate at Bowness and Wampool." Passenger traffic commenced in June 1870 and to accommodate it stations were opened at Bowness, Whitfield and Bromfield on the English side, in addition to those on the Scottish.

The choice of crossing point, despite its length, was quite logical for it chose some of the most stable ground in the bed of the Firth. The viaduct was built along the course of the Stonewath, a ford which followed a moraine left by a retreating glacier. This was one of the longest of the Solway 'waths' but considered one of the safer.

Weather was always a problem and coffer dams were frequently erected to repair scouring by fast flowing tides. In 1875 a permanent speed restriction was imposed on the viaduct after ice got inside the hollow piers and cracked them. Despite binding the piers, the structure was always susceptible and so when the great ice floes appeared in the Solway in 1881 watchmen were stationed at 50 yard intervals on the viaduct, 24 hours a day in six hour shifts. The watchmen fled on the night of 30th January when the first ice floe, estimated to be 10ft thick, hit the piers. All traffic was stopped and as dawn broke it was found that there were two breaches, one 50 yards wide, the other 300. 45 piers and 37 girders had been swept away.

Large locomotives over the viaduct were not common but they *did* cross, platform edges at Bowness being trimmed back in 1881 to allow clearance. Other more frequent visitors were Caledonian bogie ore wagons which ran between the Cumberland ore field and Lanarkshire. Mention should also be made of the three occasions when it was proposed to link the Solway Junction Railway to the Port Carlisle branch.

Dr A. Earnshaw, Caldbeck

CLARIFICATION

Following A. J. Mullay's comment that a faked photograph of the Solway Viaduct was published in the Moorfoot book 'The Last Trains 3', Moorfoot Publishing wish to point out that they printed the photograph in good faith. The decision to publish was the book's publisher's alone and not the joint authors'.

ERROR

In the article on slip coaches in Vol.2 No.2, the first line of the fourth paragraph on p62 should obviously read 'South Eastern', *not* 'South Western'. The error occured during preparation for publication and was in no way the fault of the authors. Our apologies to them — ed.

REVIEWS

OUR RATINGS

★★★★★ Excellent
★★★★ Very good
★★★ Good
★★ Fair
★ Poor

EDWARDIAN ENTERPRISE

by John Norris, Gerry Beale & John Lewis. Wild Swan Publications Ltd, 1-3 Hagbourne Road, Didcot, Oxon OX11 8DP. Hardback, 202pp, £15.95

This elegant hardback reviews the GWR's development in the first decade of this century, which saw its transformation from entrenched lethargy to national leadership in design and operation. The book's introduction sets the scene and separate chapters discuss: improvements in South Wales and the West Country respectively, the Birmingham direct line and the new route Birmingham-Bristol. Locomotives and rolling stock each have their own chapter and 'other developments', including road transport and the GWR's flirtation with electrification, are considered. Wild Swan's picture editing is as good as ever and the photo reproduction, disappointing on one or two of their recent books, is back up to scratch. Most of the 260-odd photos are unfamiliar and the 'officials', particularly, are superb. A number of maps are also included. The book has one major fault: given its 'overview' of an important period, an index should have been included as a matter of course.

★★★★ LR

SCOTTISH URBAN AND RURAL BRANCH LINES

by Geo. C. O'Hara. Eroxop Ltd, 16 Garryhorn, Prestwick KA9 2HU. Hardback, 224pp, £14.00 inc post

The first railway production from this publisher is firmly in the 'picture book' category. The majority of Scottish branches are featured in photos taken entirely in the BR era, with steam and diesel working treated even-handedly. Almost every view features a moving train, a diversity of traffic ranging from single coach passenger and pick-up goods to railcars, rail tours and diesel workings on freight-only remnants. Photo reproduction is reasonable but maps are not included "because of the short lengths ... of many branches". The captions are a major disappointment; virtually without exception they are restricted to location, date and engine number, and readers unfamiliar with the lines will close the book as ill-informed as when they opened it. That said, books on Scottish branch lines are rare and where else can you obtain nearly 400 photos of them in one purchase? If you can put up with this book's lack of information, and like the subject, you should find something here to interest you.

★★ LR

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• PUBLICATION DATES Vol.2/1988

7th January, 7th April, 7th July, 6th October

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WRITTEN BACKTRACK is Britain's biggest-selling all-historical railway magazine and we are constantly looking for quality material, both written and photographic, to fill its pages. Can you help? We are particularly keen to receive texts of 2000, 3000 and 4000 words approximately, dealing with virtually *any* aspect of British railway history up to 1975. We are not averse to an occasional 'rose-tinted' piece, but preference is given to factual and technical articles, based on primary research if possible. We also welcome contributions from professional railwaymen (past and present) who can describe working practices, however humble, accurately and unsentimentally. Appropriate photos should accompany the text if available, but we can help locate illustrations if necessary. In all cases, an initial letter or phone call describing what you have in mind is helpful.

BLACK & WHITE PHOTOS Please don't send large selections of monochrome photos of moving trains or locos from the 1950-75 period — we only require *colour* from this period. Comprehensive photo portraits of a *particular* subject (shed, station, etc) are, however, required and we are very keen to see material from the pre-nationalisation, pre-grouping and 19th century periods.

COLOUR PHOTOS BACKTRACK is setting new standards in its presentation of historic colour photographs. If you have any colour transparencies (slides) taken in the period 1935-75 we would be delighted to hear about them. We pay generous rates for the right to publish, and this process does not affect the slide in any way and you receive it back promptly after use. And don't worry about its safety — Atlantic has handled thousands of irreplaceable slides in the last few years without loss or damage — our new high-tech process sees to that (the slide does not go to the printers at all). Why not submit a few samples from your collection? Ring or write first if you wish.

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BACK COVER: Raven's Q7 0-8-0 was similar to his earlier Q6. Built 1919-1924, the class had the same 4'6" wheel but incorporated a third cylinder. Unlike their more numerous sisters, the fifteen Q7s were early casualties of dieselisation and the whole class was taken out of service in the last two months of 1962. The pioneer engine, 63460, was preserved as part of the national collection and stored at various locations, occasionally being steamed to work specials. One such was the RCTS/SLS North Eastern Railtour in 1963, and the Q7 was photographed south of Brancepeth on 28th September. Photo: Roy Hobbs

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